Kinder Morgan Linnton Terminal – Pore Water Sampling Results

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This technical memorandum presents the results of pore-water sampling conducted on December 18 and 19, 2012 and January 15 and 16, 2013 at the Kinder Morgan Linnton Terminal (KMLT or the site), located at 11400 NW Saint Helens Road in Portland, Oregon. Figure A-1 provides a site location map, and Figure A-2 presents the site layout. The pore-water samples were collected as part of the joint source control strategy (JSCS) evaluation for the site, with the specific purpose of characterizing concentrations of arsenic and arsenite in shallow pore water along the interface between groundwater and the Willamette River.

1.0 Purpose of Investigation

The purpose of this investigation was to assess concentrations of arsenic and arsenite in shallow pore water along the interface between groundwater and the Willamette River in support of the upland source control evaluation. Six pore water samples and one surface water sample were collected at the river's edge, at the bottom of the bank, to determine whether arsenic in groundwater is migrating to the river at concentrations posing an unacceptable risk to the river.

As presented in the *Kinder Morgan Linnton Terminal – Pore Water Sampling and Analysis Plan* (SAP) (CH2M HILL, 2012a), arsenic is the primary metal of concern in groundwater based on comparison of metal concentrations in groundwater to Portland Harbor JSCS screening level values (SLVs) (Oregon Department of Environmental Quality [DEQ] and United States Environmental Protection Agency [USEPA], 2007) and DEQ's Oregon default background values (DEQ, 2002). Metals other than arsenic were found to be either nondetect or below screening levels, with a few exceptions. These exceptions occurred in isolated areas, at concentrations slightly above the screening values, and do not indicate a potential threat to the river (CH2M HILL, 2012a).

Arsenic has been detected in site monitoring wells above background levels in 12 shallow groundwater wells, as shown in Table A-1. The source of arsenic is not expected to be from petroleum hydrocarbons because arsenic is not a common or significant trace element in petroleum products. The source of the arsenic is likely due to naturally occurring arsenic being mobilized from anaerobic groundwater conditions in shallow groundwater as a result of hydrocarbon degradation. Under aerobic groundwater conditions, arsenic tends to be relatively immobile, with arsenate (As^{5+}) as the dominant dissolved species. Under reducing, or anaerobic groundwater conditions, the more mobile form of arsenite (As^{3+}) becomes the dominant species.

Figure A-3 shows the most recent arsenic concentrations in groundwater and the oxidation-reduction potential (ORP) in site monitoring wells. At ORP values between 0 and -200 millivolts (mV), iron oxides and sulfide complexes dissolve, and arsenic that is sorbed on the complexes is released. Exceedances of background levels tend to be located on the northeastern portion of the site, north of the barrier wall, where ORP values tend to be negative. Arsenic has not been detected in wells MW-7 (northern part of site) and MW-8 (southern part of site) since 2007, with a single exception of an arsenic detection of 9 micrograms per liter (µg/L) in well MW-7 in July 2009. ORP is positive in wells MW-7 and MW-8, indicating conditions in the northern and southern part of the site are not favorable for arsenic mobilization in these areas. Overall, arsenic concentrations at the site are either steady or decreasing in site wells. Wells with decreasing trends are MW-3, MW-4, and MW-16.

2.0 Field Sampling Program

Pore-water samples were collected from six locations on December 18 and 19, 2012 and January 15 and 16, 2013. Sampling was conducted in accordance with the sampling procedures outlined in the SAP (CH2M HILL, 2012a) and

the SAP Addendum (CH2M HILL, 2012b). The pore-water samples were analyzed for arsenic, geochemical indicator parameters, and for ORP conditions associated with arsenic speciation and mobilization. Parameters analyzed in the field included conductivity, temperature, pH, and ORP conditions. A laboratory analysis was conducted for the following analytes:

- Total dissolved arsenic
- Arsenic III (arsenite [As^{3+}])
- Arsenic IV *(Arsenate[(As^{5+}] estimated from the difference of total dissolved arsenic and arsenite (As^{3+}) results.*
- Total dissolved manganese
- Ferrous iron
- Total dissolved iron
- Total alkalinity (as $CaCO_3$)
- Ammonia (as N)
- Methane
- Nitrate (as N)
- Total sulfide
- Total organic carbon
- Conductivity

In addition, to monitor for influence of surface water on the pore-water samples, surface-water parameters measured in the field included conductivity, temperature, pH, and ORP conditions. One surface-water sample was also analyzed by the laboratory for the same suite of analytes as the pore-water samples.

2.1 Sample Locations

Pore-water samples were collected at six locations (TW-1 to TW-6), as shown on Figure A-3. Due to boulders and large-diameter gravel, it was not possible to drive and install piezometers at proposed sampling locations TW-7 and TW-8. A sample was not collected from TW-9 either, due to gravel in the area preventing a sufficient seal around the probe. Samples were collected close to the Linnton river bank during the ebb following high tide. Table A-2 summarizes sample times and tidal information for the sample dates. Samples were collected during the ebb to ensure the shallow groundwater flux direction was upwards into surface water. Figure A-4 presents groundwater levels along the top of bank near the river and the elevation of surface water in the Willamette River during 2012. Groundwater levels were above the surface-water elevation throughout the monitoring period. The river elevation at the site is estimated from the correlation developed between river levels adjacent to the site and the United States Geological Survey (USGS) gauge 14211720 at the Morrison Bridge, about 6 miles upriver (southeast) of the site. The correlation was developed from surface-water measurements conducted as part of the tidal study in fall 2010.

Sampling locations TW-3 through TW-7 were selected to represent conditions downgradient of wells where arsenic levels in groundwater exceed background levels, including near the former recovery trench area and current barrier wall system. Although it was not possible to collect a sample from the TW-7 area, samples TW-3 through TW-5 were downgradient of areas that had higher groundwater concentrations of arsenic than the TW-7 location. The available data set is considered worst case and is sufficient for developing conclusions for the JSCS evaluation.

The sampling locations along the northern end (TW-1 and TW-2) and southern end (TW-8 and TW-9) of the property were selected to provide a basis for assessing naturally occurring background arsenic levels in pore water. Although samples could not be collected from the TW-8 and TW-9 locations, background data are available from the TW-1 and TW-2 locations.

2.2 Sampling Methods

Pore-water samples were collected using Solinst 0.75-inch drive-point piezometers. The piezometers were equipped with 6-inch-long stainless-steel screens connected to stainless-steel rods for the well casing. The piezometers were installed by either pushing the rod into the sediment by hand or by using a manual slide hammer. An aluminum stabilizing plate was attached to improve the surface seal, add stability to the probe, and guide driving the probes to the appropriate depth. For the sampling piezometers, the stabilizing plate was set at 18 inches from the top of the drive point, such that the piezometer was screened from 1 to 1.5 feet below sediment surface (bss). The samples were collected at this shallow depth since ORP conditions—and therefore the

mobility of arsenic—are expected to change sharply within the shallow transition zone. In addition, ecological exposure to transition-zone pore water is within the upper foot of river sediment.

The sampling locations were accessed from the Kinder Morgan bank by personnel wearing waders. Each sample point was under approximately 1 to 3 feet of water. A small inflatable boat was used to stage and transport sampling equipment and was anchored at each location to minimize movement during measurement/sampling. A piezometer was installed at each of the six locations for sample collection. Pore-water and surface-water elevations were measured at each location to evaluate the hydraulic head gradient in the shallow sediment. The method for measuring elevations at each of the locations is discussed below:

- **TW-5**: A second pore-water piezometer (in addition to the sample piezometer) was driven to 5 feet bss to gage pore-water levels. A stilling well was attached to the side of this piezometer to gage surface-water levels. The depth to surface water and pore water were measured from a common point (top of the pore-water piezometer). Measurements were made at several times before and after sample collection from the pore-water piezometer. Per approval from DEQ (Kenneth Thiessen, email dated December 19, 2012), water-level piezometers for subsequent locations only needed to be driven to approximately 1 to 1.5 feet bss for water-level measurements rather than to 5 feet bss, as originally planned per the SAP addendum (CH2M HILL, 2012b).
- **TW-2 and TW-6**: A second pore-water piezometer (in addition to the sample piezometer) was driven to 1 to 1.5 feet bss to gage pore-water levels. Pore-water levels were measured inside the casing, and surface-water levels were measured on the outside of casing. Both levels were measured from a common point (the top of casing). Measurements were taken several times before and after sample collection from the pore-water piezometer.
- **TW-1 and TW-4**: A second pore-water piezometer was not used at these locations. Pore-water levels were measured as the distance the water column in the sample tubing was above the top of casing of the sample piezometer. After sample collection in TW-1, the tubing from the sample piezometer was removed to allow pore water to enter the casing. Pore-water levels were measured inside the casing, and surface-water levels were measured on the outside of casing. Both levels were measured from a common point (the top of casing).
- **TW-3:** The water column was not visible above the top of casing of the sample piezometer. After analytical sample collection, the tubing from the sample piezometer was removed to allow pore water to enter the casing. Pore-water levels were measured inside the casing, and surface-water levels were measured on the outside of casing. Both levels were measured from a common point (the top of casing).

Field parameters (specific conductivity, pH, ORP, and temperature) were collected for both pore water and surface water at each sample location. Pore-water parameters were collected directly from the pore-water sample tubing. Surface-water parameters were collected from the river using a graduated cylinder to fill the parameter meter. Both pore-water and surface-water parameters were collected to evaluate whether there was infiltration of surface water into the piezometric screen. The field parameter results are discussed further in Section 3.2.

2.3 Sampling Results

2.3.1 Water Elevations and Hydraulic Gradients

Results of the pore-water elevation and surface-water elevation gaging are summarized in this section and in Table A-3. Differences in elevations at each location were used to evaluate the hydraulic head gradient in the shallow sediment. Pore-water elevations were generally higher than surface-water elevations, indicating that shallow groundwater is discharging to the river. The differences in water levels also indicate the sample casings were well sealed, and samples that were collected are representative of pore water. A summary of water levels is as follows:

- **TW-5:** Pore-water levels in the sampling tubing were, on average, 2.3 feet above river levels, although water levels were on average 4 feet below river levels in the 5-foot-bss piezometer. Water levels were continually rising in the piezometer over a 90-minute period but were slow to respond.

- **TW-4:** Pore-water levels were 1 to 1.5 feet higher than river levels based on the water level measured in the sample tubing prior to sampling.
- **TW-3:** Pore-water level was gaged after sampling by removing the sample tubing from the piezometer and allowing the inner casing to fill with pore water. The pore-water level was equal with the surface-water level after the tubing was removed.
- **TW-1:** Pore-water level was initially 1.15 feet above river level, as measured from the sampling tubing. After sampling, the tubing was removed, and the piezometer filled with pore water. Over several hours, the water level was 0.05 foot above the river level.
- **TW-2:** Pore-water levels were initially lower than river levels prior to sampling. After sampling, pore-water levels were above river levels. The piezometer was gauged the following morning and was 0.2 foot above river levels.
- **TW-6:** Pore-water levels were on average, 0.1 foot above river levels.

Samples were collected during a period when river stage was decreasing overall, as shown on Figure A-5, though river stage still fluctuated during the months when the samples were collected, as shown on Figure A-6.

3.0 Field Parameters

Field parameters including specific conductivity, pH, ORP, and temperature were measured in surface water at each sampling site for comparison with pore-water parameters to evaluate whether there was infiltration of surface water into the piezometric screen. Pumping rates were also maintained at low rates to prevent pulling surface water down into the probe. At least three casing volumes were pumped from the pore-water boreholes until field parameters stabilized to ensure representative sampling of pore-water quality. Surface-water parameters, the range of pore-water parameters, and surface-water results from the USGS Morrison Street Bridge gage station are shown in Table A-4 and on Figure A-6. Pore-water parameter results and purge rates are shown in Table A-5.

3.1 Surface-water Parameters

The surface-water parameters collected at the site generally correspond to data collected by the USGS at the Morrison Street Bridge gage station at the time samples were collected. The conductivity of the gage station ranged from 65 to 70 mV, and the site data ranged between 68 to 74 mV. The pH of the gauge station varied slightly from 6.9 to 7.1. The two locations measured on December 19 (TW-3 and TW-4) were within this range at 7.02 and 7.08. Two sample locations, TW-1 and TW-5, were slightly lower at values of 6.11 and 6.59. The final two locations, TW-2, and TW-6, had higher pH values ranging from 7.19 to 9.80. The higher readings are likely a result of instrument errors.

Temperature readings collected in December at the site were within the range of the gaging station, although In January, the gaging station ranged from 3.8 to 4.1°C, while the site data was slightly higher ranging from 4.5 to 5.1°C but relatively consistent.

3.2 Pore-water Parameters

The field parameters collected during the December 2012 and January 2013 sampling events varied and may be reflective of the timing of the sampling events with the changing level of the river stage. The average Willamette River stage during the December 2012 event was 12.8 feet North American Vertical Datum of 1998 (NAVD88), while the stage during the January event was over 3 feet lower at an average of 9.3 feet NAVD88, as shown on Figure A-6.

December 2012. Conductivity measured during the December event showed distinct differences between surface-water and pore-water measurements. The conductivity of surface water was approximately 70 mV for the three samples. TW-5 pore-water conductivity ranged from 99 to 102 mV. TW-3 and TW-4 pore-water conductivities ranged from 209 to 220 mV.

River ORP measurements during the December event ranged from 256 to 298 mV, and pore-water values ranged from 234 to 323 mV.

The pH values between the river and pore water differed by approximately 1 unit. The pH of the river was approximately 7.0 at each location, while pore water ranged from 5.79 to 6.27 in the three December locations. The river pH value from the USGS Morrison Street Bridge gage was used for location TW-5 because the value on site appears anomalous compared to the USGS gage and other river pH values collected in December.

Pore-water temperature data was collected; however, these data may not be representative given that the sampling tubing was in contact with river water, possibly altering temperature values.

January 2013. Conductivity measured during the January event showed distinct differences between river and pore water. The conductivity of surface water ranged from 69 to 74 mV, while TW-1 conductivity ranged from 442 to 451 mV, TW-2 ranged from 968 to 1,033 mV, and TW-6 ranged from 633 to 639 mV.

ORP pore-water measurements during the January event showed a highly reducing environment. ORP at the three sample locations were negative, ranging from -28 to -100, while river values ranged from 16 to 225.

pH values during the January event fluctuated in both the pore-water and river samples. The river sample values were not similar to the USGS Morrison Street Bridge gaging station and likely reflect instrument errors.

Temperature data for pore water were collected, although may not be representative given that the sampling tubing was in contact with river water, possibly altering temperature values.

The range in the different percentages of river water compared to site-related groundwater between the samples collected on the two dates captures conditions representative during these two periods when groundwater gradients toward the river are at seasonal highs and at seasonal lows. Tidal fluctuations and stage changes in the river are expected to result in short-term flow reversals within transition-zone waters, which would affect the geochemistry within the transition zone.

4.0 Arsenic and General Chemistry Results

Analytical laboratory data from pore-water samples and one surface-water sample are summarized in Table A-6 and Figure A-7. The laboratory reports can be found in Attachment 1.

Arsenic, manganese, and other general chemistry parameter concentrations in pore water correspond to the shift from more aerobic conditions in December to more the reducing conditions in January. Arsenic, total dissolved iron, ferrous iron, manganese, and methane concentrations were all lower in the December 2012 than those detected in the January 2013 event. Concentrations of total dissolved arsenic in the December event ranged from 0.18 to 0.37 µg/L. During the January event, arsenic ranged from 0.49 to 6.8 µg/L. Arsenate (As^{5+}) was the dominant species[1] during the December event, and arsenite (As^{3+}) was the dominant species during the January event.

Total arsenic concentrations are screened against the DEQ background value of 2 µg/L (DEQ, 2002). Sample results from the December event, collected from TW-3, TW-4, and TW-5, were below arsenic background levels. Samples TW-3 through TW-5 were downgradient of areas that had higher arsenic groundwater concentrations. Samples from the January event exceeded the background value at two locations (TW-2 and TW-6). The highest concentration of arsenic was detected at TW-2 (6.8 µg/L). The TW-2 location was chosen as a background location because this location is north of the area with elevated arsenic detected in monitoring wells at the top of bank, although TW-2 may be considered to also be downgradient of groundwater with high arsenic. Arsenic in pore-water samples collected at TW-6 (downgradient of the barrier wall) was detected at 4.56 µg/L. Samples from the December and January sampling events were below the JSCS SLV for arsenite (As^{3+}) of 190 µg/L.

Manganese is the only other parameter collected that has a JSCS SLV. The SLV value of 50 µg/L is for secondary standard maximum concentration limit. The next highest SLV is for fish consumption at 150 µg/L. The results from the sampling event vary between December and January. The December results range from 17.6 to 79.5 µg/L. The

[1] Arsenate (As^{5+}) was estimated from the difference of total dissolved arsenic and arsenite (As^{3+}) results.

January results range from 824 to 13,400 µg/L. The background location TW-1 also has high levels of manganese (824 µg/L) and exceeded the SLV.

The range in the different percentages of river water compared to site-related groundwater between the samples collected on the two dates captures conditions representative during these two periods when groundwater gradients toward the river are at seasonal highs and at seasonal lows. Tidal fluctuations and stage changes in the river are expected to result in short-term flow reversals within transition-zone waters, which would affect the geochemistry within the transition zone.

5.0 Comparison with Lower Willamette Group Results

Six pore-water samples (the Lower Willamette Group [LWG] report (2009) uses Transition Zone Water [TWZ] terminology for pore water) were collected from the river, close to the site, between October and December 2005 as part of the LWG remedial investigation, as shown on Figure A-7. Sample depths ranged from 0 to 1.25 feet bss and were collected using both tridents and small-volume peepers. Samples were collected both in the groundwater discharge zones and in the low-to-no groundwater discharge zone, as shown in Table A-7. River stage levels during collection of LWG samples were at a seasonal low, averaging 8 feet NAVD88 from October to December 2005, as presented on Figure A-8. This river stage value was lower than both the December 2012 sampling (12.8 feet NAVD88) and January 2013 sampling (9.3 feet NAVD88). Concentrations of arsenic in samples collected ranged from 0.74 to 11.6 µg/L. Concentrations of manganese ranged from 455 to 7,150 µg/L in peepers and filtered trident samples. Unfiltered trident samples had results up to 8,640 µg/L, although unfiltered results are not likely to be as representative of the mobile fraction of chemicals in TWZ. Sample results are shown in Table A-7. ORP values are also shown in Table A-7 for the three locations at which it was measured. Each of the ORP readings shows a negative ORP value ranging from -47 to -104 mV (LWG, 2009).

Arsenic in TWZ from the LWG sampling are comparable to those collected in December 2012 and January 2013. The LWG arsenic results ranged from 0.74 to 11.6 µg/L, while the 2012 and 2013 arsenic results ranged from 0.17 to 6.8 µg/L. The LWG ORP values ranged from -47 to -104 mV, which are similar to the January 2013 ORP values ranging from -28 to -100 mV. Manganese results are also similar, ranging from 455 to 7,150 µg/L during the LWG sampling event to 824 to 13,400 µg/ for the January 2013 sampling event.

The LWG report also compared arsenic and manganese in TWZ to upland groundwater wells at the site and to wells identified by DEQ as being representative of background conditions for the study area. The LWG report provides the following conclusions:

- “differences in concentrations of arsenic in TWZ and near shore upland groundwater from Site wells are not statistically significant” (see Section C4.2.1, Table C4.1-3). The report also concluded, “Although the difference in arsenic concentration in TZW and [Study Area] background groundwater was found to be statistically significant (Table C4.2-1), the range in concentration measured in TZW (0.074 to 11.6 µg/L) is comparable in overall magnitude to the range measured in the background groundwater (non-detect to 8.56 µg/L).”
- “TZW manganese concentrations at the Kinder Morgan Linnton site fall at the upper end of the concentration range measured in background groundwater, but are consistent with the concentrations measured in TZW and upland groundwater at the other eight GWPA sites (Figure C4.1-3).” “Statistical and spatial analyses demonstrated that the concentrations of manganese were not significantly different in TZW across all nine of the sites.”
- “The results for manganese and arsenic are generally consistent with natural biogeochemical processes acting on all river sediment rather than site-specific groundwater discharges.”
- “While the data suggest some possibility that petroleum-related chemicals in upland groundwater may be migrating to the transition zone in this area, it is equally if not more plausible that the concentrations of these chemicals in TZW are controlled by chemical partitioning to pore water from sediment rather than transport from upland groundwater. “

6.0 Data Validation

This section discusses the quality assurance/quality control procedures for the project, as well as handling, storage, and delivery of samples. The environmental sample quality assurance/quality control program for the site is designed to meet end usage of the data collected during this work.

One field duplicate pore-water sample was collected during this investigation. An equipment blank was not collected during the event since dedicated screens and tubing were used for each sample location.

Samples were analyzed for dissolved arsenic and dissolved arsenite (As^{3+}) using USEPA Method 1632. Arsenate (As^{5+}) was estimated in pore-water samples from the difference of arsenic and arsenate results. The standard detection limits using USEPA Method 1632 are lower than the default Oregon background value (DEQ, 2002) and the SLV.

The data validation summary indicates that the overall precision and accuracy of the data suggests that the data quality objectives were met and that the analytical results can be used to support the decision-making process. The data validation summary is included in Attachment 2.

7.0 Conclusions and Recommendations

The results and analysis of this investigation indicate that the samples collected during both December 2012 and January 2013 are representative of pore water based on the distinct differences between the field parameter and analytical data of both the pore-water and surface-water samples collected during both events. The shift from more aerobic conditions in December to more the reducing conditions in January is representative of periods when groundwater gradients toward the river are at seasonal highs and at seasonal lows. Tidal fluctuations and stage changes in the river are expected to result in short-term flow reversals within transition-zone waters, which affects the geochemistry within the transition zone. The average river stage during the December event was 12.8 feet NAVD88 compared to 9.3 feet NAVD88 during the January event. River levels were over 3 feet lower in January, resulting in a higher head gradient toward the river, increasing the flux from groundwater to the river.

Results from the January 2013 event likely represents “worst-case” arsenic and manganese concentrations, given the highly reducing environment, which more readily mobilizes arsenic and manganese. The TW-6 location, sampled during the January 2013 event is immediately downgradient of the barrier well. The pore-water arsenic concentration in TW-6 was 6.8 µg/L—3.4 times the DEQ background concentration of 2 µg/L. However, this result was well within the range of results from the LWG sampling event (0.74 to 11.6 µg/L). Manganese values were below or just above the SLV during the December event. Manganese results from the January event ranged from 824 to 13,400 µg/L, similar to the LWG sampling event, which ranged from 455 to 7,150 µg/L. As stated in the LWG report, “The results for manganese and arsenic are generally consistent with natural biogeochemical processes acting on all river sediment rather than site-specific groundwater discharges” (LWG, 2009).

Arsenic and manganese in site pore water has been characterized and has likely captured the “worst-case” concentrations for the site. Based on these results—and the results of the LWG TWZ sampling—migration of constituents of potential concern in upland groundwater to the transition zone is not significantly influencing pore water. Information and conclusions from this pore-water report will be included in the Linnton Terminal groundwater source control evaluation report.

8.0 References

CH2M HILL. 2010. *Kinder Morgan Linnton Terminal River Bank Erodibility Assessment.* Prepared for Kinder Morgan Liquids Terminals LLC. November 15.

CH2M HILL. 2011. *Subsurface Bank Soils Investigation Results.* Prepared for Kinder Morgan Liquid Terminals, LLC. March.

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Lower Willamette Group (LWG). 2009. *Portland Harbor RI/FS, Remedial Investigation Report, Appendix C2, Groundwater Pathway Assessment and Geochemical Analysis*. October 27.

Oregon Department of Environment Quality (DEQ). 2002. *Default Background Concentrations for Metals.* October 28.

Oregon Department of Environment Quality and the United States Environmental Protection Agency (DEQ/USEPA). 2007. *Portland Harbor Joint Source Control Strategy*. December 2005. Table 3-1 updated July 16, 2007.

Tables

TABLE A-1
Total Arsenic Concentrations (µg/L) in Shallow Groundwater
Kinder Morgan Liquid Terminals, Linnton Terminal

		Arsenic
		µg/L
	Portland Harbor SLV [1]	0.045
	Oregon DEQ Default Background [2]	2
Well ID	**Sample Date**	
MW-1	01/26/12	**6.6**
	07/25/12	5 U
MW-3	01/26/12	**29**
	07/25/12	**29**
MW-4	01/26/12	5 U
	07/25/12	5U
MW-5	01/25/12	5 U
	07/25/12	5 U
MW-6	01/25/12	5 U
	07/25/12	**30**
MW-7	01/25/12	5 U
	07/25/12	5 U
MW-8	01/25/12	5 U
	07/26/12	5 U
MW-9	01/26/12	**28**
	07/26/12	**31**
MW-10	01/26/12	**6.4**
MW-12	01/25/12	**68**
MW-13	01/25/12	**77**
	07/25/12	**17**
MW-14	01/25/12	5 U
	07/25/12	5 U
MW-15	01/25/12	5 U
	07/25/12	5 U
MW-16	07/26/12	**71**
MW-17	01/25/12	5 U
	07/25/12	**13**
MW-18	01/25/12	5 U
	07/25/12	5 U
MW-20	01/26/12	**11**
MW-21	01/26/12	5 U
	07/26/12	5 U
MW-22	01/26/12	5 U
	07/26/12	5 U
MW-25	01/26/12	**56**
	07/25/12	**38**
MW-26	01/26/12	**30**
	07/26/12	**40**

NOTES:
Total Metals analyzed by USEPA Method 6000/7000 Series Method, or SW6020/6020A.
U = Analyte not detected above laboratory method reporting limits. Value shown is the reporting limit.
Bold Face Font = Analyte detected in sample.
Shaded - concentration exceeds both background and screening levels
1. The source of each Screening Level Value (SLV) is documented in Table 3.1 of the Portland Harbor Joint Source Control Strategy, dated December 2005 and revised in July 2007.
2. *Default Background Concentrations for Metals, Oregon Department of Environmental* Quality. October 28, 2002.

Table A-2 - Tidal Cycles during Porewater Sampling
December 2012 - January 2013
Kinder Morgan Liquid Terminals, Linnton Terminal

Sample Date	Sample Time	Location	High Tide	Low Tide
12/18/12	14:20	TW-5	10:30	18:00
12/19/12	14:00	TW-4	11:00	19:15
12/19/12	16:20	TW-3	11:00	19:15
01/15/13	11:30	TW-1	8:30	16:00
01/15/13	16:10	TW-2	8:30	16:00
01/16/13	14:15	TW-6	9:15	17:45

NOTES:
1.) Gauge information used to determine tides was obtained from the United States Geological Survey Morrison Bridge Gauge (USGS 14211720)
http://waterdata.usgs.gov/usa/nwis/uv?site_no=14211720
2.) Only high and low tide on either side of sample time are shown.

Table A-3 - Elevations
Porewater Sampling
Kinder Morgan Liquid Terminals, Linnton Terminal

	Date	Time	Above, Below or Equal to River Level	Measurement (Feet)
TW-5	12/18/2013	1343	Above	2.22
		1348	Above	2.25
		1353	Above	2.26
		1359	Above	2.29
		1331	Below	4.19
		1355	Below	4.04
		1500	Below	3.79
TW-4	12/19/2012	1120	Above	1.0 to 1.5
TW-3	12/19/2012	1620	Equal	0
TW-1	1/15/2013	1030	Above	1.15
		1145	Below	2.42
		1417	Above	0.13
		1543	Above	0.05
TW-2	1/15/2013	1543	Below	0.33
		1548	Below	0.27
		1558	Equal	0
		1642	Above	0.04
	1/16/2013	1205	Above	0.2
TW-6	1/16/2013	1319	Above	0.03
		1413	Above	0.13
		1455	Above	0.16

Table A-4 - Comparison of Surface Water and Field Parameters
Porewater Sampling
Kinder Morgan Liquid Terminals, Linnton Terminal

Date	Time	Location	Conductivity (mV)	Temperature (degrees C)	ORP	DO (mg/L)	pH[1]
December 2012							
12/18/2012	14:09 - 14:55	TW-5	99 - 102	5.6 - 6.5	234 to 269	--	5.9 - 6.27
12/18/2012	14:51	TW-5 (River)	69	6.6	256	--	6.11
12/18/2012	14:00 - 15:00	USGS Morrison	70	6.6 - 6.7	--	13.8	7.00
12/19/2012	13:47 - 14:23	TW-4	209 - 213	6.8 - 7.1	294 to 299	--	5.79 - 6.02
12/19/2012	15:15	TW-4 (River)	69	--	297	--	7.02
12/19/2012	13:30 - 15:30	USGS Morrison	65	6.4 - 6.5	--	14	6.9 - 7.0
12/19/2012	16:09 - 16:41	TW-3	216 - 220	7.0 - 7.2	301 to 323	--	5.97 - 6.05
12/19/2012	16:48	TW-3 (River)	68	6.7	298	--	7.08
12/19/2012	16:00 - 17:00	USGS Morrison	65	6.4	--	14	7.00
January 2013							
1/15/2013	10:30 - 11:45	TW-1	442 - 451	4.8 - 5.6	-32 to -73	--	6.43 - 7.44
1/15/2013	10:45	TW-1 (River)	74	5.0	225	--	6.59
1/15/2013	10:30 - 12:00	USGS Morrison	70 - 71	4.1	--	13.7	7.10
1/15/2013	14:55 - 15:20	TW-2	968 - 1033	3.4 - 5.1	-40 to100	--	7.24 - 9.82
1/15/2013	14:56 - 15:57	TW-2 (River)	70 - 74	5.0 - 5.1	16 to 102	--	7.19 - 9.80
1/15/2013	14:30 - 16:00	USGS Morrison	71	4.1	--	13.7	7.10
1/16/2013	13:55 - 14:11	TW-6	633 - 639	4.6 - 5.1	-28 to -82	--	7.36 - 8.48
1/16/2013	14:12	TW-6 (river)	69	4.5	63	--	7.83
1/16/2013	13:30 - 14:30	USGS Morrison	72	3.8 - 3.9	--	13.8	7.10

NOTES:
1. pH meter readings for the January sampling event show a high degree of flucuation. The river water values are not similar to the USGS Morrison Street Bridge gaging station and likely reflect inaccurate pH field meter readings.

Table A-5 - Field Parameters
Porewater Sampling
Kinder Morgan Liquid Terminals, Linnton Terminal

Location	Sample ID	Date	Time	Cumulative Volume (ml)	Average Rate (ml/min)	Conductivity (mV)	Temperature (degrees C)	ORP	pH[1]
TW-5 Area	TW-5	18-Dec	14:08:00	0	--	--	--	--	--
			14:11:19	400	121	--	--	--	--
			14:12:13	500	111	--	--	--	--
			14:16:11	700	50	--	--	--	--
			14:36:00	2700	101	99	6.5	234	6.27
			14:47:00	2900	18	100	5.8	267	5.90
			14:48:00	3100	200	101	5.7	269	5.90
			14:55:00	3300	29	102	5.6	261	6.10
TW-5 Area	River	18-Dec	14:51:00	--	--	69	6.6	256	6.11
TW-4 Area	TW-4	19-Dec	13:47:15	0	--	--	--	--	--
			13:48:05	150	180	209	6.8	295	5.79
			13:52:00	400	64	210	7.0	294	6.00
			13:54:53	650	87	210	7.1	298	6.02
			14:23:10	2650	71	213	--	299	6.01
TW-4 Area	River	19-Dec	15:15	--	--	69	--	297	7.02
TW-3 Area	TW-3	19-Dec	16:08:20	0	--	--	--	--	--
			16:09:41	150	111	220	7.0	301	6.05
			16:12:38	400	85	219	7.1	304	5.97
			16:15:07	650	101	220	7.2	316	5.99
			16:17:50	900	92	219	7.2	323	6.02
			16:41	2900	86	216	7.0	311	6.01
TW-3 Area	River	19-Dec	16:48	--	--	68	6.7	298	7.08
TW-1 Area	TW-1	15-Jan	10:55:12	0	--	--	--	--	--
			10:56:55	200	117	442	5.1	-32	6.49
			11:01:29	450	55	447	5.6	-55	6.43
			11:09:11	900	58	447	5.0	-48	6.96
			11:13:00	1150	66	446	4.8	-68	6.91
			11:32:00	2150	53	448	4.8	-73	7.44
			11:45:00	3150	77	451	4.8	-44	7.44
TW-1 Area	River	15-Jan	10:45:00	--	--	74	5.0	225	6.59
TW-2 Area	TW-2	15-Jan	14:50:00	0	--	--	--	--	--
			14:53:30	90	26	--	--	--	--
			14:55:00	200	73	968	4.8	-75	8.38
			15:00:00	590	77	995	5.1	-90	9.82
			15:10:40	1190	56	993	4.7	-93	8.14
			15:20:00	1690	54	999	4.4	-100	8.00
			unable to remove bubbles from tubing, installed a second probe approximately 5 ft closer to shore						
			15:36:00	0	--	--	--	--	--
			15:48:00	500	42	1033	4.5	-52	8.13
			15:58:00	750	25	1031	4.5	-50	7.24
			16:08:00	950	20	1031	4.2	-62	7.24
			17:10:00	2950	32	1031	3.4	-40	8.06
TW-2 Area	River	15-Jan	14:56:00	--	--	70	5.1	16	9.80
			15:57:00	--	--	74	5.0	102	7.19
TW-6 Area	TW-6	16-Jan	13:51	0	--	--	--	--	--
			13:55	275	69	633	4.6	-82	8.48
			13:59	450	44	639	4.6	-41	7.91
			14:05	800	58	637	5.1	-28	7.38
			14:11	1300	83	636	4.8	-28	7.36
TW-6 Area	River	16-Jan	14:12	--	--	69	4.5	63	7.83

NOTES:
1. pH meter readings for the January sampling event show a high degree of flucuation. The river water values are not similar to the USGS Morrison Street Bridge gaging station and likely reflect inaccurate pH field meter readings.

Table A-6 - Analaytical Data Summary
Porewater Sampling
Kinder Morgan Liquid Terminals, Linnton Terminal

Sample ID	Sample Date	Arsenic (III)	Arsenic (V)	Inorganic Arsenic (Total Dissolved)	Alkalinity, Bicarbonate as CaCO3	Alkalinity, Carbonate as CaCO3	Alkalinity, Total as CaCO3	Ammonia-N	Conductivity	Ferrous Iron	Total Dissolved Iron	Total Dissolved Manganese	Methane	Nitrate-N	Total Sulfide	Total Organic Carbon
		µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	mg/L	µg/L	mg/L
Screening Values	**SLV[1]**	**190**	**--**	**0.045**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**50**	**--**	**--**	**--**	**--**
	Background[2]	**--**	**--**	**2**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
SURFACE-WATER	12/19/12	0.039 U	**0.13**	**0.173**	**23.9**	5 U	**23.9**	0.014 U	**70.9**	0.039 U	**105**	**9.11 J**	**2.92 ***	**0.16**	**54.1**	**2.13**
TW-1	01/15/13	**0.23**	**0.26**	**0.494**	NA	NA	**207**	**0.35**	**387**	**11.7**	**28300**	**824**	**1080**	0.0077 U	**38.2**	**1.63**
TW-2	01/15/13	**4.77**	**2.03**	**6.8**	NA	NA	NA	**0.24**	**928 J**	**19.5**	**41300**	**13400**	**2060**	0.0077 U	**16.5 J**	**6.51**
TW-3	12/19/12	0.012 U	**0.27**	**0.285**	107	5 U	**107**	**0.4**	**220**	0.039 U	**598**	**79.5**	**0.13 J***	**0.12**	**18.1 J**	**2.57**
TW-4	12/19/12	0.016 U	**0.17**	**0.182**	**102**	5 U	**102**	0.014 U	**218**	**0.045 J**	8 U	**17.6**	**16.4 ***	0.0075 U	7.96 U	**3.69**
TW-5	12/18/12	0.012 U	**0.35**	**0.366**	**34.3**	5 U	**34.3**	0.014 U	**97**	**0.051 J**	**1300**	**49.1**	**0.037 J**	**1.7**	7.96 U	**1.63**
TW-6	01/16/13	**4.2**	**0.36**	**4.56**	NA	NA	**311**	**0.25**	**611**	**5.48**	**13200**	**3440**	**506 J**	**0.081**	**27.6**	**3.37**

NOTES:
U = Analyte not detected above laboratory method detection limits. Value shown is the reporting limit.
J = Estimated Value
* = Sample received by lab on 12/20/12, but was analyzed outside the 14-day hold time
** = Sample analyzed outside of holding time
NA = Sample not analyzed
Bold = Value detected
Bold and Shaded = Exceeds SLV or background value
1. The source of each SLV is documented in Table 3.1 of the Portland Harbor Joint Source Control Strategy, dated December 2005 and revised in July 2007.
2. Default Background Concentrations for Metals, Oregon Department of Environmental Quality. October 28, 2002.

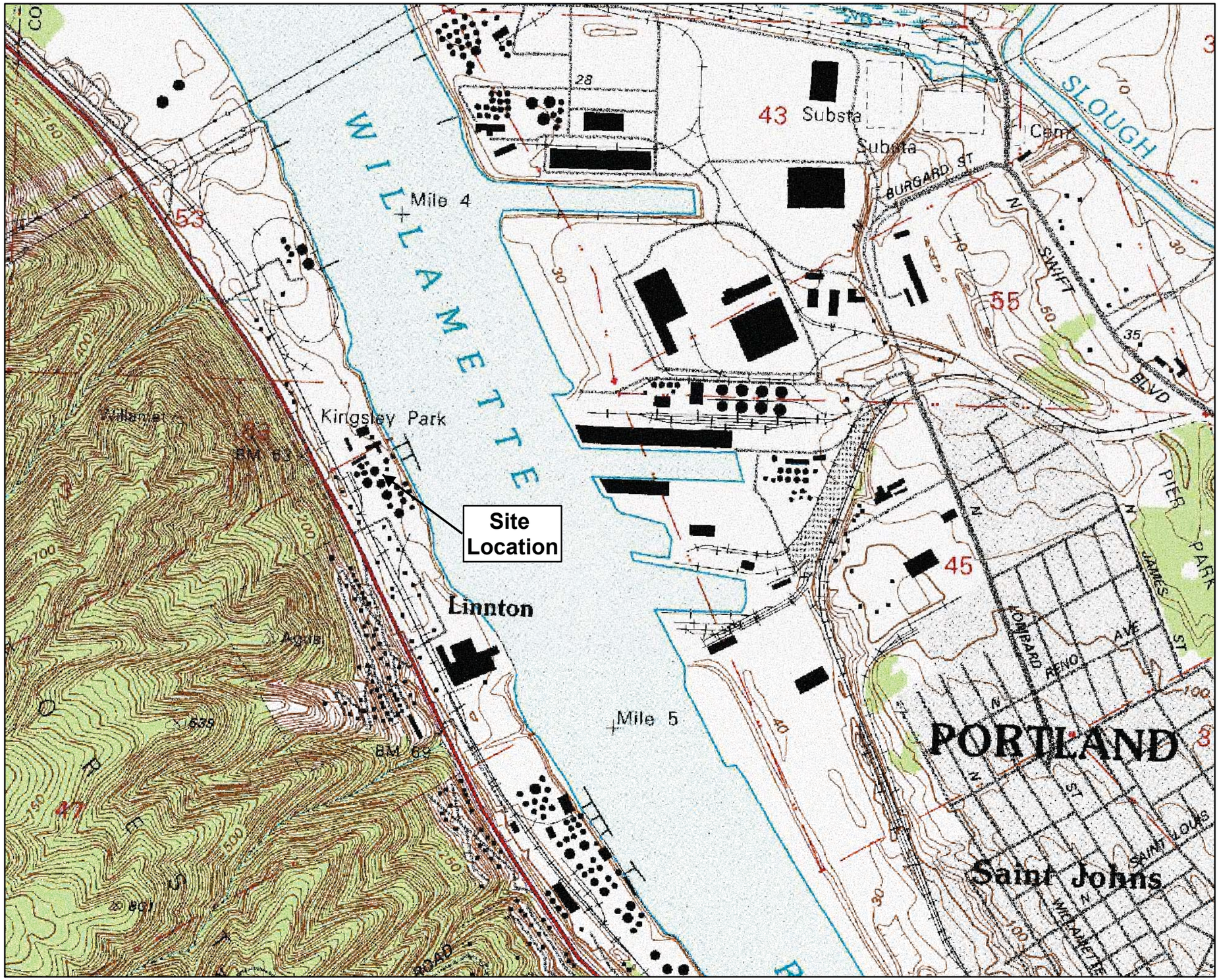
Table A-7 - LWG Pore-Water Sampling Results
Round 2 LWG Sampling Event (October 3 - December 5, 2005)
Kinder Morgan Liquid Terminals, Linnton Terminal

Sampling Site	Depth (ft) (1)	Groundwater Discharge Zone (2)	Sampling Method	Arsenic (µg/L) (3)		Manganese (µg/L) (3)		ORP (mV) (3)
				Filtered Trident and Peeper	Unfiltered Trident	Filtered Trident and Peeper	Unfiltered Trident	
SLV(4)				**0.045**	**0.045**	**50**	**50**	
Background(5)				**2**	**2**	**--**	**--**	
KM-08-A	1	Yes	Trident	**8.31**	**8.56**	**2990**	**2790**	-47
R2-KM-01	1	Yes	Trident	**6.8**	**6.12**	**6150**	**8640**	-47
KM-06-A	0 - 1.25	No	Peeper	**0.74**	NA	**455**	NA	NA
KM-10-A	0 - 1.25	No	Peeper	**2.38**	NA	**1420**	NA	NA
KM-11-B	0 - 1.25	No	Peeper	**4.04**	NA	**1560**	NA	NA
R2-KM-02	0 - 1.25	No	Peeper	**11.6**	NA	**7150**	NA	NA
	> 1.25	No	Trident	NA	NA	NA	NA	-104

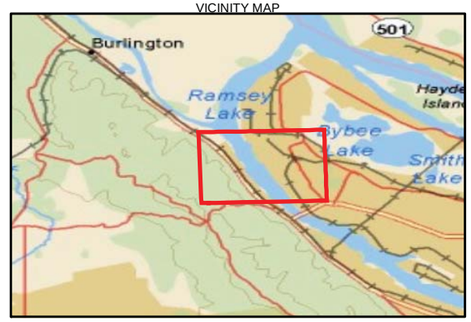
NOTES:
(1) Depth information from Table C3.0-3 and Table C3.0-1 in Appendix C of the LWG 2009 RI
(2) Sample collected in an area characterized as a groundwater discharge zone in the LWG 2009 RI (see Figure C3.1-2d, Appendix C2)
(3) Data from Table C4.1-1 in Appendix C2 of the LWG 2009 RI
(4)The source of each Screening Level Value (SLV) is documented in Table 3.1 of the Portland Harbor Joint Source Control Strategy, dated December 2005 and revised in July 2007.
(5) Default Background Concentrations for Metals, Oregon Department of Environmental Quality. October 28, 2002.

NA = Sample not analyzed
Bold = Value detected
Bold and Shaded = Exceeds both the screening level and the Oregon DEQ Default Background of 2 µg/L for Arsenic

Figures



VICINITY MAP



LEGEND

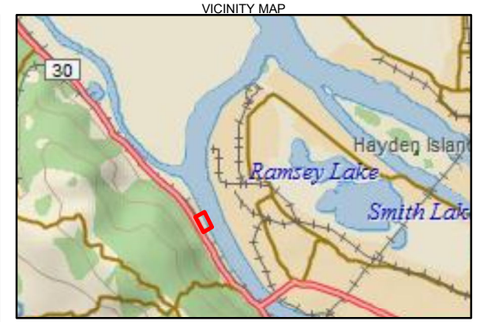
N

0 500 1,000 1,500
Feet

1 inch = 1,000 feet

FIGURE A-1
Site Location Map
Kinder Morgan
Multnomah County, OR

VICINITY MAP



LEGEND

- Sheet Pile Wall
- Historic Trench System
- Approximate Area Where Sheen was Observed
- Approximate Extent of Diesel Release Identified in 1994
- Railroad

Linnton Terminal Wells

- Monitoring Well - Deep
- Monitoring Well - Shallow
- Piezometer
- Hydraulic Control Well for Wall
- 3-Foot Diameter Cistern

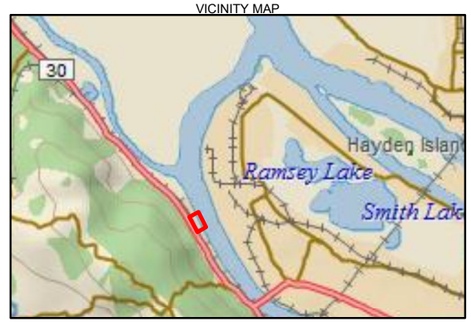
N

0 125 250

Feet

FIGURE A-2
Site Layout
Kinder Morgan Liquid Terminals LLC
Linnton Terminal
11400 NW St. Helens Road
Portland, Oregon

VICINITY MAP



LEGEND

- Sheet Pile Wall

Proposed Pore Water Sample Location

- Not Sampled
- Sampled

Linnton Terminal Wells

- Monitoring Well - Shallow
- Monitoring Well - Deep
- Piezometer
- Hydraulic Control Well for Wall
- 3-Foot Diameter Cistern

Well Labels

MW-9	Well ID
31	Arsenic Concentration[1] (ug/L) (bold if exceeds DEQ background concentration of 2 ug/L)
-33	ORP (millivolts)

Notes:
[1] Arsenic concentration is for most recent sample collected in 2012. Value not shown if well was not sampled in 2012.
* ORP not measured during most recent sampling event.
U = nondetect
mg/L = milligrams per Liter
ORP = oxidation reduction potential

N

0 50 100 200
Feet

FIGURE A-3
Pore Water Sampling Locations
Kinder Morgan Liquid Terminals LLC
Portland, Oregon

Figure A-4
Surface Water and Groundwater Elevations

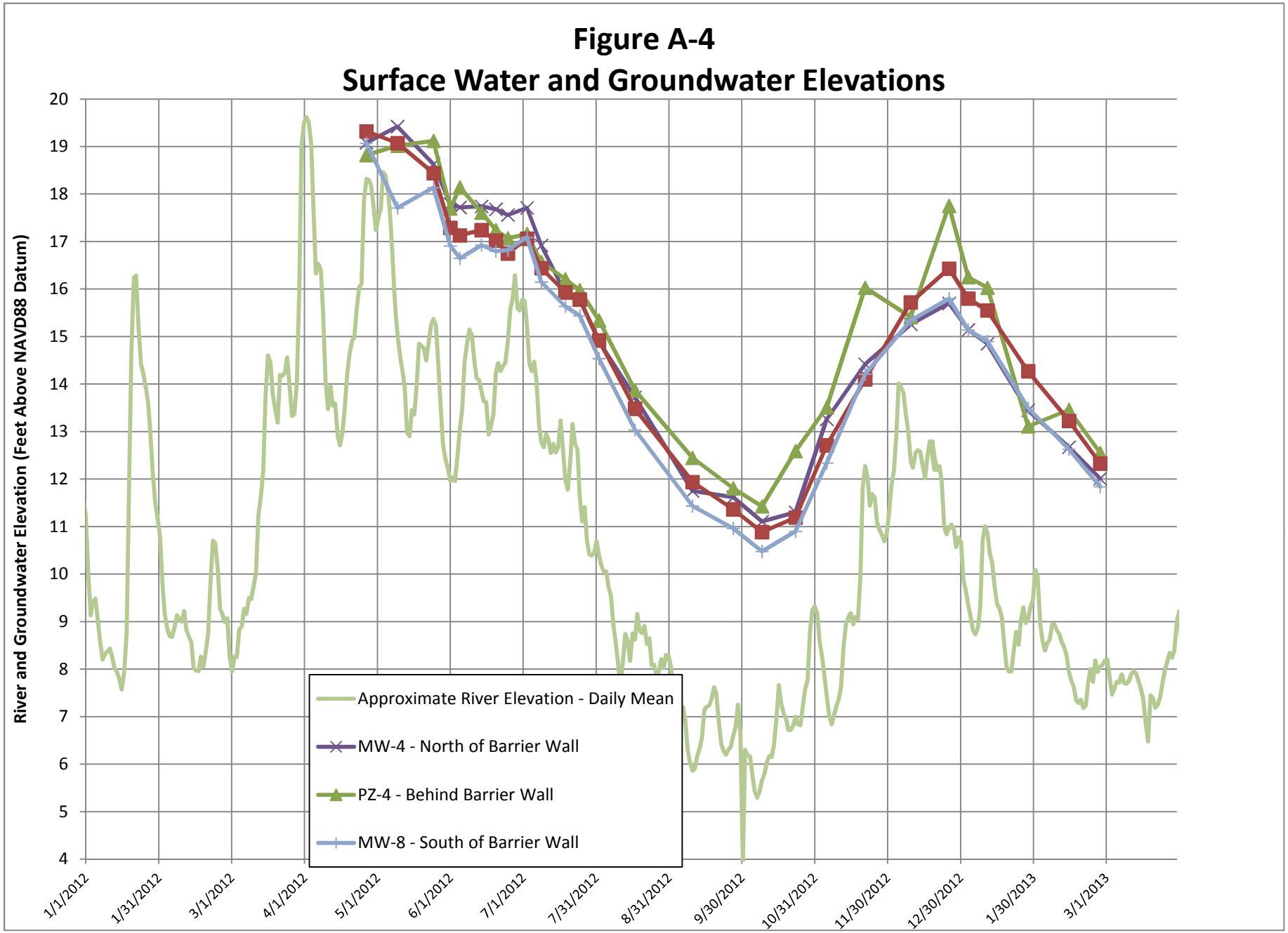


Figure A-5
Pore Water Sampling - Willamette River Stage

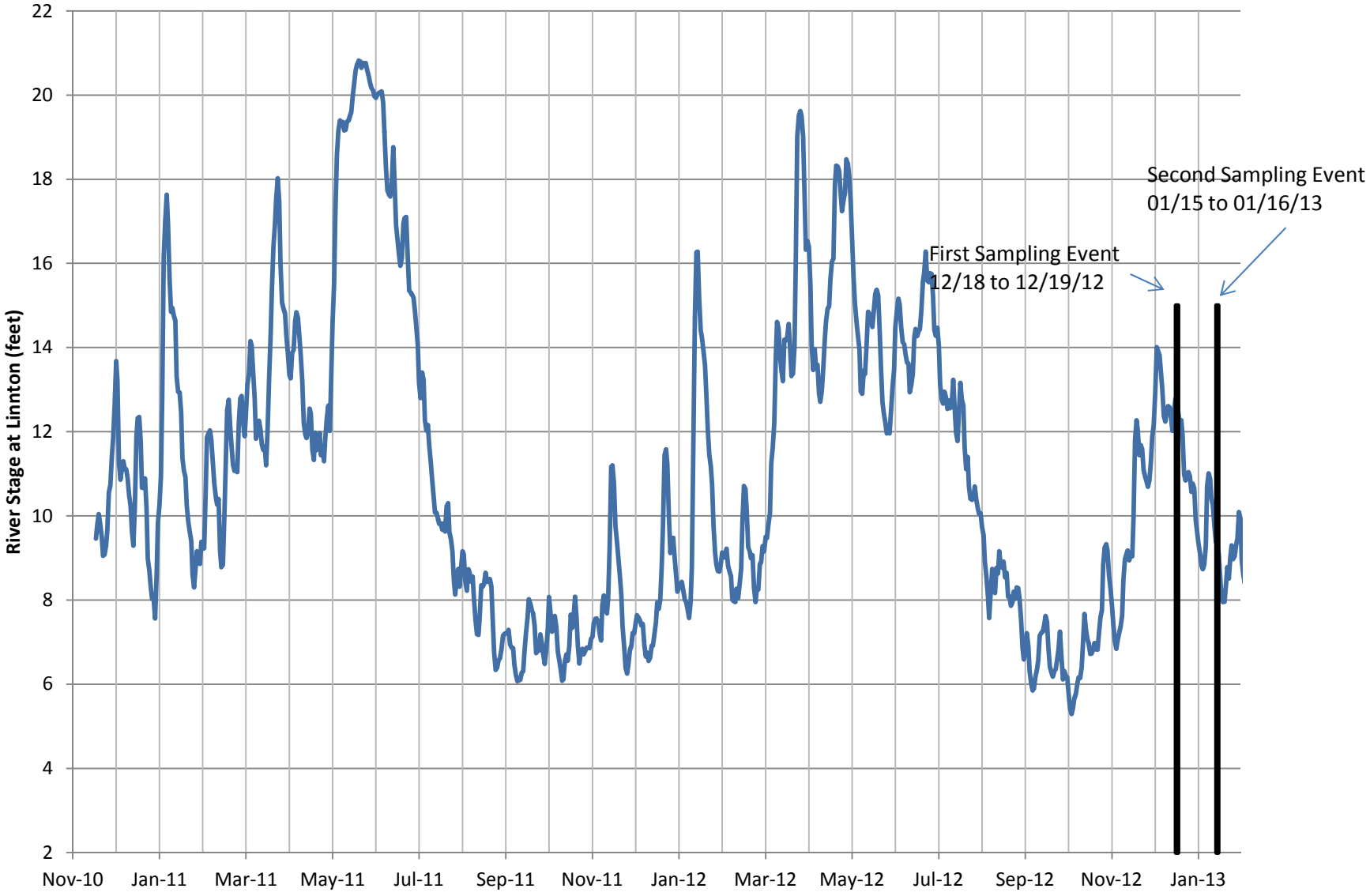
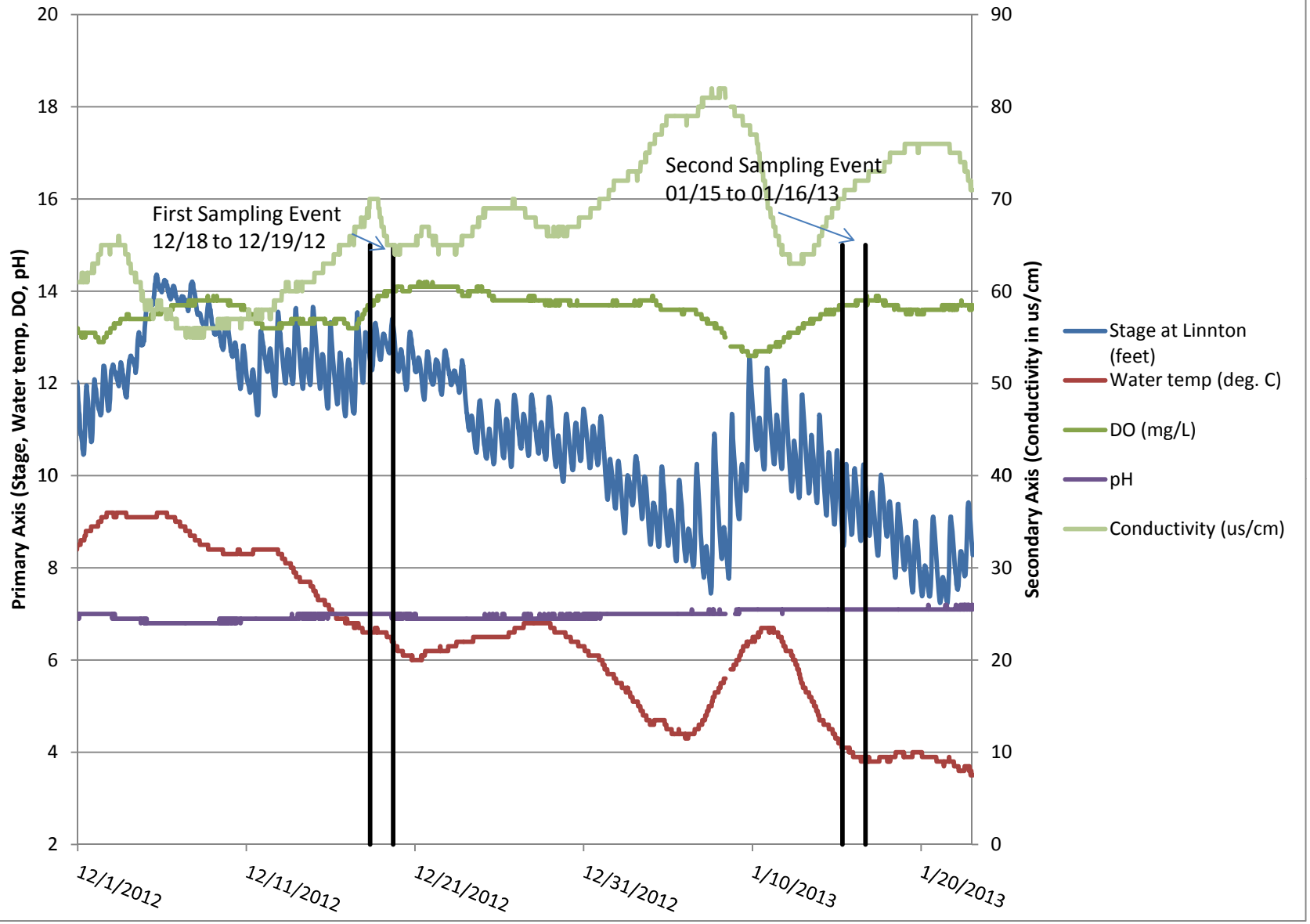
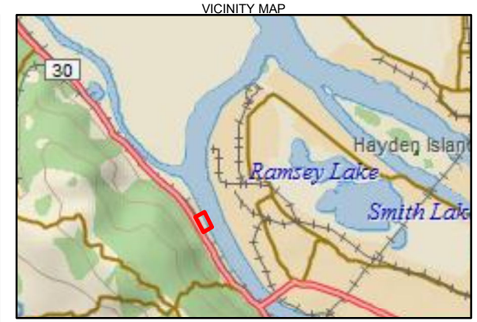


Figure A-6
Willamette River Parameters - USGS Gauge at Morrison Bridge



VICINITY MAP



LEGEND

- Sheet Pile Wall
- LWG Groundwater Discharge Zone

Linnton Terminal Wells

- Monitoring Well - Shallow
- Monitoring Well - Deep
- Piezometer
- Hydraulic Control Well for Wall
- 3-Foot Diameter Cistern

Proposed Pore Water Sample Location

- Not Sampled
- Sampled (Total Arsenic in ug/L)

LWG Pore Water Sampling Locations

- Trident, filtered (Total Arsenic in ug/L))
- Peeper (Total Arsenic in ug/L)

Pore Water Sample Labels

TW-1 Samplel ID
0.031 Arsenic Concentration[1] (ug/L)

Notes:
1) LWG samples were collected between October 3 and December 2, 2005 as part of the Round 2 sampling for the LWG 2009 Remedial Investigation (RI). Peeper samples were collected at depths of 0 - 1.25 feet, trident samples were collected at depths of 1 foot.

2) CH2M Hill collected pore-water samples at TW-3, TW-4, and TW-5 on December 19, 2012; samples were collected at TW-1, TW-2, and TW-6 on January 15, 2013

3) All arsenic concentrations are reported as Total Dissolved

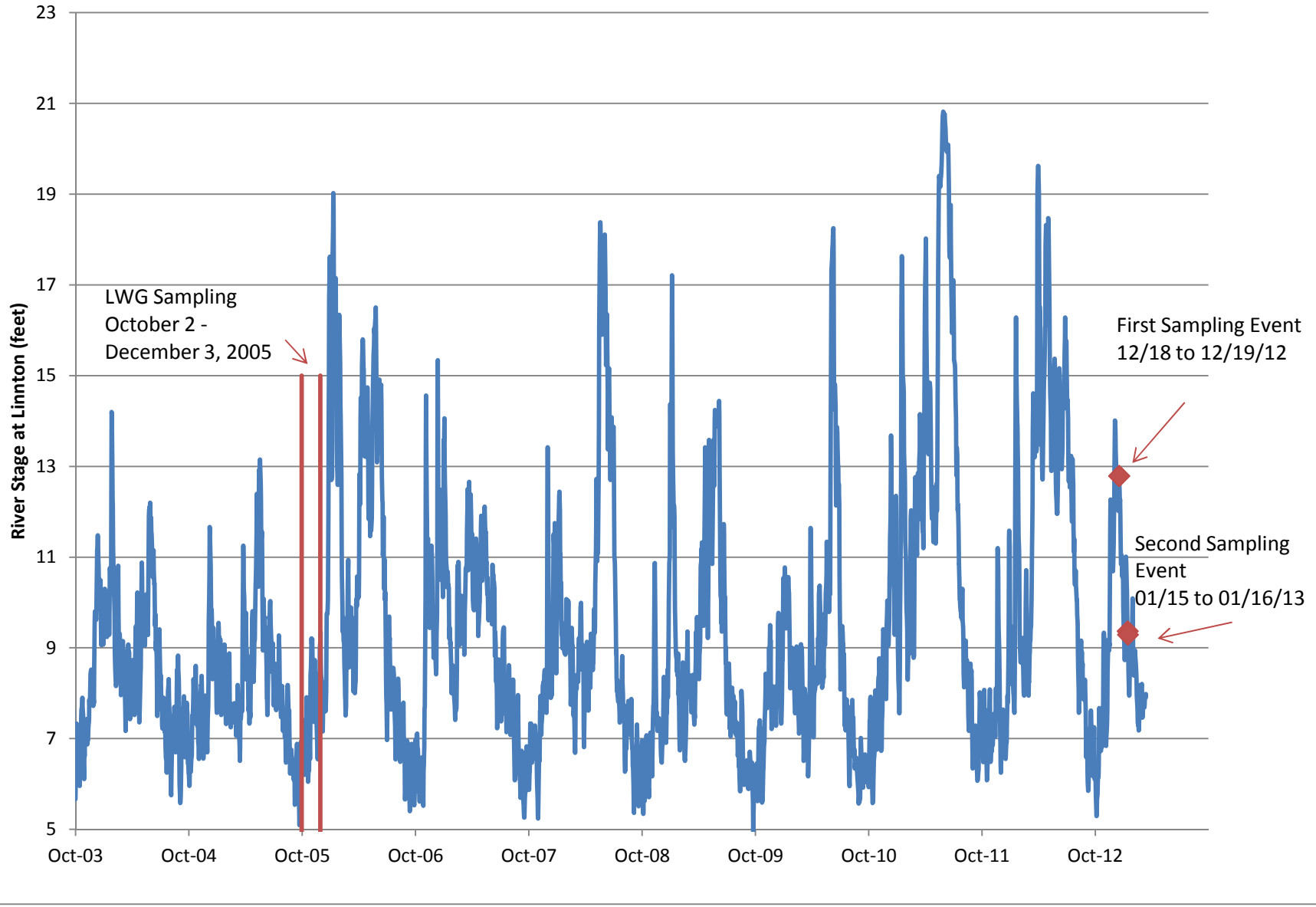
ug/L = micrograms per Liter

N

0 50 100 200
Feet

FIGURE A-7
Pore Water Sampling Results
Kinder Morgan Liquid Terminals LLC
Portland, Oregon

Figure A-8
Willamette River Stage - Linnton



Attachment 1
Analytical Laboratory Reports

January 9, 2013 Analytical Report for Service Request No: K1212737

Eric Aronson
CH2M Hill
2020 Southwest Fourth Ave.
Suite 300
Portland, OR 97201

RE: Kinder Morgan-Linnton/436002.01.06

Dear Eric:

Enclosed are the results of the samples submitted to our laboratory on December 21, 2012. For your reference, these analyses have been assigned our service request number K1212737.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.caslab.com. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3275. You may also contact me via Email at Chris.Leaf@alsglobal.com.

Respectfully submitted,

Columbia Analytical Services, Inc. dba ALS Environmental

Chris Leaf
Project Manager

CL/mj

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Environmental www.caslab.com ▪ www.alsglobal.com
RIGHT SOLUTIONS RIGHT PARTNER

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

Columbia Analytical Services, Inc. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2286
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L12-28
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Georgia DNR	http://www.gaepd.org/Documents/techguide_pcb.html#cel	881
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
Indiana DOH	http://www.in.gov/isdh/24859.htm	C-WA-01
ISO 17025	http://www.pjlabs.com/	L12-27
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	3016
Louisiana DHH	Not available	LA110003
Maine DHS	Not available	WA0035
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-368
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA35
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
New Mexico ED	http://www.nmenv.state.nm.us/dwb/Index.htm	-
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA200001
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	4704427-08-TX
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C1203
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.caslab.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.caslab.com or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

CHAIN OF CUSTODY

ALS Environmental
1317 South 13th Ave., Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

SR# 14212

PAGE 1 OF 1 COC#

PROJECT NAME: KINDER MORGAN - LAWTON
PROJECT NUMBER: 436002.01.06
PROJECT MANAGER: KEITH SHEETS
COMPANY NAME: CH2M HILL
ADDRESS: 2020 SW FOURTH AVE, SUITE 300
CITY/STATE/ZIP: PORTLAND, OR 97201
E-MAIL ADDRESS: keith.sheets@ch2m.com
PHONE #: 503-235-2000 FAX #: 503-736-2000
SAMPLER'S SIGNATURE:

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Metals: Total or Dissolved (See List below)	REMARKS
TW-5-121812	12/18/12	1420				X	
TW-4-121912	12/19/12	1400				X	
SURFACE WATER-121912	12/19/12	1530				X	
TW-3-121912	12/19/12	1620				X	

Semivolatile Organics by GC/MS 625☐ 8270☐ SIM PAH☐
Volatile Organics 624☐ 8260☐ 8021☐ BTEX☐
Hydrocarbons (*see below) Gas☐ Diesel☐ Oil☐
Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐
PCBs Aroclors☐ Congeners☐
Pesticides/Herbicides 608☐ 8081☐ 8141☐ 8151☐
Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐
Cyanide☐ Hex-Chrom☐
(circle) pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS, Turb
(circle) NH_3-N, COD, TKN, TOC, DOC, NO_2+NO_3, T-Phos
TOX 9020☐ AOX 1650☐ 506☐
Alkalinity ☐ CO_3☐ HCO_3☐
Dioxins/Furans 1613☐ 8290☐
Dissolved Gases RSK 175☐ CO_2☐ Methane☐ Ethane☐ Ethene☐

REPORT REQUIREMENTS

X I. Routine Report: Method Blank, Surrogate, as required
___ II. Report Dup., MS, MSD as required
___ III. CLP Like Summary (no raw data)
___ IV. Data Validation Report
X V. EDD

INVOICE INFORMATION

P.O. #
Bill To:

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 day
X Standard (15 working days)
___ Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al (As) Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: _____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

DISSOLVED ARSENIC AND DISSOLVED ARSENITE (AS(III)).
BOTH FIELD FILTERED
BOTH BY METHOD 1632

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 12/20/12 1400	Date/Time: 12-21-12 0910	Date/Time:	Date/Time:
Printed Name: BRAD OSTERWALD	Printed Name: [illegible]	Printed Name:	Printed Name:
Firm: CH2M HILL	Firm: ALS	Firm:	Firm:

PC CC

Cooler Receipt and Preservation Form

Client / Project: CH2MHILL Service Request *K12* 12737

Received: 12-21-12 Opened: 12-21-12 By: SD Unloaded: 12-21-12 By: SD

1. Samples were received via? *Mail* (*Fed Ex*) *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other*_____ *NA*
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? 2 = 1-F 1-B
   If present, were custody seals intact? (Y) N If present, were they signed and dated? (Y) N

Raw Temp	Corr. Temp	Raw Blank	Corr. Blank	Corr. Factor	Thermometer ID	Cooler/COC ID (NA)	Tracking Number NA	Filed
+0.6	-0.4	1.0	8	-0.2	304		794370307721	

7. Packing material: *Inserts* (*Baggies*) *Bubble Wrap* *Gel Packs* (*Wet Ice*) *Dry Ice* *Sleeves* _____
8. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
9. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA (Y) N
10. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
11. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA (Y) N
12. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
13. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below.* 12/21/12 SD NA (Y) N
14. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
15. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Client:	CH2M Hill	**Service Request:**	K1212737
Project:	Kinder Morgan-Linnton/436002.01.06	**Date Collected:**	12/18/12
Sample Matrix:	Water	**Date Received:**	12/21/12

Dissolved Metals

Sample Name:	TW-5-121812	Units:	ug/L (ppb)
Lab Code:	K1212737-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.02	0.003	1	NA	12/26/12	0.012	J
Arsenic (V)	None	1632 Rev. A	0.02	0.003	1	NA	NA	0.354	
Inorganic Arsenic	None	1632 Rev. A	0.02	0.003	1	NA	12/28/12	0.366	

Client:	CH2M Hill	**Service Request:**	K1212737
Project:	Kinder Morgan-Linnton/436002.01.06	**Date Collected:**	12/19/12
Sample Matrix:	Water	**Date Received:**	12/21/12

Dissolved Metals

Sample Name:	TW-4-121912	Units:	ug/L (ppb)
Lab Code:	K1212737-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.02	0.003	1	NA	12/26/12	0.016	J
Arsenic (V)	None	1632 Rev. A	0.02	0.003	1	NA	NA	0.166	
Inorganic Arsenic	None	1632 Rev. A	0.02	0.003	1	NA	12/28/12	0.182	

Client:	CH2M Hill	**Service Request:**	K1212737
Project:	Kinder Morgan-Linnton/436002.01.06	**Date Collected:**	12/19/12
Sample Matrix:	Water	**Date Received:**	12/21/12

Dissolved Metals

Sample Name:	Surface Water-121912	Units:	ug/L (ppb)
Lab Code:	K1212737-003	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.02	0.003	1	NA	12/26/12	0.039	
Arsenic (V)	None	1632 Rev. A	0.02	0.003	1	NA	NA	0.134	
Inorganic Arsenic	None	1632 Rev. A	0.02	0.003	1	NA	12/28/12	0.173	

Client:	CH2M Hill	**Service Request:**	K1212737
Project:	Kinder Morgan-Linnton/436002.01.06	**Date Collected:**	12/19/12
Sample Matrix:	Water	**Date Received:**	12/21/12

Dissolved Metals

Sample Name:	TW-3-121912	Units:	ug/L (ppb)
Lab Code:	K1212737-004	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.02	0.003	1	NA	12/26/12	0.012	J
Arsenic (V)	None	1632 Rev. A	0.02	0.003	1	NA	NA	0.273	
Inorganic Arsenic	None	1632 Rev. A	0.02	0.003	1	NA	12/28/12	0.285	

Client:	CH2M Hill	**Service Request:**	K1212737
Project:	Kinder Morgan-Linnton/436002.01.06	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Total Metals

Sample Name:	Method Blank 1	Units:	ug/L (ppb)
Lab Code:	K1212737-MB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.02	0.003	1	NA	12/26/12	0.016	J
Inorganic Arsenic	None	1632 Rev. A	0.02	0.003	1	NA	12/28/12	0.004	J

Client:	CH2M Hill	**Service Request:**	K1212737
Project:	Kinder Morgan-Linnton/436002.01.06	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Total Metals

Sample Name:	Method Blank 2	Units:	ug/L (ppb)
Lab Code:	K1212737-MB2	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.02	0.003	1	NA	12/26/12	0.017	J
Inorganic Arsenic	None	1632 Rev. A	0.02	0.003	1	NA	12/28/12	0.005	J

Client:	CH2M Hill	**Service Request:**	K1212737
Project:	Kinder Morgan-Linnton/436002.01.06	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Total Metals

Sample Name:	Method Blank 3	Units:	ug/L (ppb)
Lab Code:	K1212737-MB3	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.02	0.003	1	NA	12/26/12	0.008	J
Inorganic Arsenic	None	1632 Rev. A	0.02	0.003	1	NA	12/28/12	ND	

Client:	CH2M Hill	**Service Request:**	K1212737
Project:	Kinder Morgan-Linnton/436002.01.06	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Total Metals

Sample Name:	Method Blank 4	Units:	ug/L (ppb)
Lab Code:	K1212737-MB4	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Inorganic Arsenic	None	1632 Rev. A	0.02	0.003	1	NA	12/28/12	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

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QA/QC Report

Client:	CH2M Hill	**Service Request:**	K1212737
Project:	Kinder Morgan-Linnton/436002.01.06	**Date Collected:**	12/19/12
Sample Matrix:	Water	**Date Received:**	12/21/12
		Date Extracted:	NA
		Date Analyzed:	12/28/12

Matrix Spike/Duplicate Matrix Spike Summary

Dissolved Metals

Sample Name:	TW-4-121912	Units:	ug/L (ppb)
Lab Code:	K1212737-002S, K1212737-002SD	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	Method Acceptance Limits	Relative Percent Difference	Result Notes
Inorganic Arsenic	None	1632 Rev. A	0.02	0.2	0.2	0.182	0.378	0.368	98	93	50-150	3	

COLUMBIA ANALYTICAL SERVICES, INC.

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QA/QC Report

Client:	CH2M Hill	**Service Request:**	K1212737
Project:	Kinder Morgan-Linnton/436002.01.06	**Date Collected:**	12/19/12
Sample Matrix:	Water	**Date Received:**	12/21/12
		Date Extracted:	NA
		Date Analyzed:	12/26/12

Matrix Spike/Duplicate Matrix Spike Summary

Dissolved Metals

Sample Name:	Surface Water-121912	Units:	ug/L (ppb)
Lab Code:	K1212737-003S, K1212737-003SD	Basis:	NA
Test Notes:			

				Spike Level		Sample	Spike Result		Percent Recovery		Method Acceptance	Relative Percent	
Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MS**	**DMS**	**Result**	**MS**	**DMS**	**MS**	**DMS**	**Limits**	**Difference**	**Result Notes**
Arsenic (III)	None	1632 Rev. A	0.02	0.2	0.2	0.039	0.252	0.268	107	115	30-170	6	

COLUMBIA ANALYTICAL SERVICES, INC.

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QA/QC Report

Client:	CH2M Hill	**Service Request:**	K1212737
Project:	Kinder Morgan-Linnton/436002.01.06	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	12/26, 28/12

Calibration Verification (CALVER) Sample Summary

Total Metals

Sample Name: CALVER 1

Units: ug/L (ppb)

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Arsenic (III)	None	1632 Rev. A	0.200	0.228	114	70-130	
Inorganic Arsenic	None	1632 Rev. A	0.200	0.176	88	80-120	

COLUMBIA ANALYTICAL SERVICES, INC.

Now part of the ALS Group

QA/QC Report

Client:	CH2M Hill	**Service Request:**	K1212737
Project:	Kinder Morgan-Linnton/436002.01.06	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	12/26, 28/12

Calibration Verification (CALVER) Sample Summary

Total Metals

Sample Name: CALVER 2

Units: ug/L (ppb)

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Arsenic (III)	None	1632 Rev. A	0.200	0.186	93	70-130	
Inorganic Arsenic	None	1632 Rev. A	0.200	0.171	86	80-120	

COLUMBIA ANALYTICAL SERVICES, INC.

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QA/QC Report

Client:	CH2M Hill	**Service Request:**	K1212737
Project:	Kinder Morgan-Linnton/436002.01.06	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	12/28/12

Calibration Verification (CALVER) Sample Summary

Total Metals

Sample Name: CALVER 3

Units: ug/L (ppb)

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Inorganic Arsenic	None	1632 Rev. A	0.200	0.176	88	80-120	

February 4, 2013 Analytical Report for Service Request No: K1300509

Keith Sheets
CH2M Hill
2020 Southwest Fourth Ave.
Suite 300
Portland, OR 97201

RE: Kinder Morgan-Linnton/467443.01.01

Dear Keith:

Enclosed are the results of the samples submitted to our laboratory on January 18, 2013. For your reference, these analyses have been assigned our service request number K1300509.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.caslab.com. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3275. You may also contact me via Email at Chris.Leaf@alsglobal.com.

Respectfully submitted,

Columbia Analytical Services, Inc. dba ALS Environmental

Chris Leaf
Project Manager

CL/ln

Columbia Analytical Services
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PHONE +1 360 577 7222 | FAX +1 360 636 1068
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Environmental www.caslab.com ▪ www.alsglobal.com
RIGHT SOLUTIONS RIGHT PARTNER

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

Columbia Analytical Services, Inc. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2286
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L12-28
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Georgia DNR	http://www.gaepd.org/Documents/techguide_pcb.html#cel	881
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
Indiana DOH	http://www.in.gov/isdh/24859.htm	C-WA-01
ISO 17025	http://www.pjlabs.com/	L12-27
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	3016
Louisiana DHH	Not available	LA110003
Maine DHS	Not available	WA0035
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-368
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA35
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
New Mexico ED	http://www.nmenv.state.nm.us/dwb/Index.htm	-
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA200001
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	4704427-08-TX
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C1203
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.caslab.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.caslab.com or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

CHAIN OF CUSTODY

ALS Environmental

1317 South 13th Ave., Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

SR# K1300509

PAGE 1 OF 1 COC#

PROJECT NAME	467443.01.01
PROJECT NUMBER	KINDER MORGAN - LINTON
PROJECT MANAGER	KEITH SHEETS
COMPANY NAME	CH2M HILL
ADDRESS	2020 SW FOURTH AVE, SUITE 300
CITY/STATE/ZIP	PORTLAND, OR 97201
E-MAIL ADDRESS	keith.sheets@ch2m.com
PHONE #	503-235-5000 FAX # 503-736-2000
SAMPLER'S SIGNATURE	

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ SIM PAH☐	Volatile Organics 624☐ 8270LL☐ 8260☐ 8021☐ BTEX☐	Hydrocarbons (*see below) Gas☐ Diesel☐ Oil☐	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCBs Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081☐ 8141☐ 8151☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	Metals, Total or Dissolved (See List below)	Cyanide☐ Hex-Chrom☐	(circle) pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS, Turb.	(circle) NH_3-N, COD, TKN, TOC, DOC, NO_2+NO_3, T-Phos	TOX 9020☐ AOX 1650☐ 506☐	Alkalinity☐ CO_3☐ HCO_3☐	Dioxins/Furans 1613☐ 8290☐	Dissolved Gases CO_2☐ RSK 175☐ Methane☐ Ethane☐ Ethene☐	REMARKS
TW-1-011513	01/15/13	1130		W	2								X								
TW-2-011513	01/15/13	1610		W	1								X								
TW-6-011613	01/16/13	1415		W	1								X								

REPORT REQUIREMENTS

- X I. Routine Report: Method Blank, Surrogate, as required
- ___ II. Report Dup., MS, MSD as required
- ___ III. CLP Like Summary (no raw data)
- ___ IV. Data Validation Report
- X V. EDD

INVOICE INFORMATION

P.O. # ___

Bill To: ___

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.

___ 5 day

X Standard (15 working days)

___ Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al (As) Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: ___ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

Dissolved Arsenic and Dissolved Arsenite (As (III)).
Both Field Filtered
Both by Method 1632

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature:	Signature: DAVIS	Signature:	Signature:
Date/Time: 01/17/13 1500	Date/Time: 1/18/13 0915	Date/Time:	Date/Time:
Printed Name: BRAD OSTROM	Printed Name: DAVIS	Printed Name:	Printed Name:
Firm: CH2M HILL	Firm: ALS	Firm:	Firm:

PC CL

Cooler Receipt and Preservation Form

Client / Project: CH2M HILL Service Request K13 00509

Received: 1/18/13 Opened: 1/18/13 By: SD Unloaded: 1/18/13 By: SD

1. Samples were received via? *Mail* (*Fed Ex*) *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other*_____ *NA*
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? 2 = 1F 1B
   If present, were custody seals intact? (Y) N If present, were they signed and dated? (Y) N

Raw Temp	Corr. Temp	Raw Blank	Corr. Blank	Corr. Factor	Thermometer ID	Cooler/COC ID (NA)	Tracking Number NA	Filed
-0.5	0.3			-0.2	307		794547260487	

7. Packing material: *Inserts* (*Baggies*) (*Bubble Wrap*) *Gel Packs* (*Wet Ice*) *Dry Ice* *Sleeves* _____
8. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
9. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA (Y) N
10. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
11. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA (Y) N
12. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
13. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y (N)
14. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
15. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time
TW-2-011513	1 250 mL				✓					

Notes, Discrepancies, & Resolutions: _____

Page ____ *of* ____

COLUMBIA ANALYTICAL SERVICES, INC.

Now part of the ALS Group

Analytical Report

Client:	CH2M Hill	**Service Request:**	K1300509
Project:	Kinder Morgan-Linnton/467443.01.01	**Date Collected:**	01/15/13
Sample Matrix:	Water	**Date Received:**	01/18/13

Dissolved Metals

Sample Name:	TW-1-011513	Units:	ug/L (ppb)
Lab Code:	K1300509-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.02	0.003	1	NA	01/29/13	0.232	
Inorganic Arsenic	None	1632 Rev. A	0.04	0.006	2	NA	01/28/13	0.494	

COLUMBIA ANALYTICAL SERVICES, INC.

Now part of the ALS Group

Analytical Report

Client:	CH2M Hill	**Service Request:**	K1300509
Project:	Kinder Morgan-Linnton/467443.01.01	**Date Collected:**	01/15/13
Sample Matrix:	Water	**Date Received:**	01/18/13

Dissolved Metals

Sample Name:	TW-2-011513	Units:	ug/L (ppb)
Lab Code:	K1300509-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.4	0.06	20	NA	01/29/13	4.77	
Inorganic Arsenic	None	1632 Rev. A	0.4	0.06	20	NA	01/28/13	6.80	

COLUMBIA ANALYTICAL SERVICES, INC.

Now part of the ALS Group

Analytical Report

Client:	CH2M Hill	**Service Request:**	K1300509
Project:	Kinder Morgan-Linnton/467443.01.01	**Date Collected:**	01/16/13
Sample Matrix:	Water	**Date Received:**	01/18/13

Dissolved Metals

Sample Name:	TW-6-011613	Units:	ug/L (ppb)
Lab Code:	K1300509-003	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.4	0.06	20	NA	01/29/13	4.20	
Inorganic Arsenic	None	1632 Rev. A	0.4	0.06	20	NA	01/28/13	4.56	

Client:	CH2M Hill	**Service Request:**	K1300509
Project:	Kinder Morgan-Linnton/467443.01.01	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Total Metals

Sample Name:	Method Blank 1	Units:	ug/L (ppb)
Lab Code:	K1300509-MB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.02	0.003	1	NA	01/29/13	ND	
Inorganic Arsenic	None	1632 Rev. A	0.02	0.003	1	NA	01/28/13	ND	

Client:	CH2M Hill	**Service Request:**	K1300509
Project:	Kinder Morgan-Linnton/467443.01.01	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Total Metals

Sample Name:	Method Blank 2	Units:	ug/L (ppb)
Lab Code:	K1300509-MB2	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.02	0.003	1	NA	01/29/13	0.004	J
Inorganic Arsenic	None	1632 Rev. A	0.02	0.003	1	NA	01/28/13	0.005	J

Client:	CH2M Hill	**Service Request:**	K1300509
Project:	Kinder Morgan-Linnton/467443.01.01	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Total Metals

Sample Name:	Method Blank 3	Units:	ug/L (ppb)
Lab Code:	K1300509-MB3	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.02	0.003	1	NA	01/29/13	0.008	J
Inorganic Arsenic	None	1632 Rev. A	0.02	0.003	1	NA	01/28/13	0.005	J

COLUMBIA ANALYTICAL SERVICES, INC.

Now part of the ALS Group

QA/QC Report

Client:	CH2M Hill	**Service Request:**	K1300509
Project:	Kinder Morgan-Linnton/467443.01.01	**Date Collected:**	01/15/13
Sample Matrix:	Water	**Date Received:**	01/18/13
		Date Extracted:	NA
		Date Analyzed:	01/28/13

Matrix Spike/Duplicate Matrix Spike Summary

Dissolved Metals

Sample Name:	TW-1-011513	Units:	ug/L (ppb)
Lab Code:	K1300509-001MS, K1300509-001MSD	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	Method Acceptance Limits	Relative Percent Difference	Result Notes
Arsenic (III)	None	1632 Rev. A	0.02	0.2	0.2	0.232	0.359	0.345	64	57	30-170	4	
Inorganic Arsenic	None	1632 Rev. A	0.02	0.4	0.4	0.494	0.791	0.708	74	54	50-150	11	

COLUMBIA ANALYTICAL SERVICES, INC.

Now part of the ALS Group

QA/QC Report

Client:	CH2M Hill	**Service Request:**	K1300509
Project:	Kinder Morgan-Linnton/467443.01.01	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	1/28, 29/13

Calibration Verification (CALVER) Sample Summary

Total Metals

Sample Name: CALVER 1

Units: ug/L (ppb)

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Arsenic (III)	None	1632 Rev. A	0.200	0.186	93	70-130	
Inorganic Arsenic	None	1632 Rev. A	0.200	0.178	89	80-120	

COLUMBIA ANALYTICAL SERVICES, INC.

Now part of the ALS Group

QA/QC Report

Client:	CH2M Hill	**Service Request:**	K1300509
Project:	Kinder Morgan-Linnton/467443.01.01	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	1/28, 29/13

Calibration Verification (CALVER) Sample Summary

Total Metals

Sample Name: CALVER 2

Units: ug/L (ppb)

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Arsenic (III)	None	1632 Rev. A	0.200	0.192	96	70-130	
Inorganic Arsenic	None	1632 Rev. A	0.200	0.171	86	80-120	

ANALYTICAL REPORT

For:
Kinder Morgan Liquid Termminal

ASL Report #: L3061
Project ID: 436002.01.06
Attn: Keith Sheets/PDX
cc:
Eric Aronson/PDX

Authorized and Released By:

Kathy McKinley

Laboratory Project Manager
Kathy McKinley
(541) 758-0235 ext.23144
January 14, 2013

This data package meets standards requested by client and is not intended or implied to meet any other standard.

All analyses performed by CH2M HILL are clearly indicated. Any subcontracted analyses are included as appended reports as received from the subcontracted laboratory. The results included in this report only relate to the samples listed on the following Sample Cross-Reference page. This report shall not be reproduced except in full, without the written approval of the laboratory.

Any unusual difficulties encountered during the analysis of your samples are discussed in the attached case narratives.

Sample Receipt Comments

We certify that the test results meet all standard ASL requirements.

Sample Cross-Reference

ASL Sample ID	Client Sample ID	Date/Time Collected	Date Received
L306101	TW-5-121812	12/18/12 14:20	12/19/12

CASE NARRATIVE
METALS ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: L3061

Project: Kinder Morgan Project #: 436002.01.06

I. Method(s):

Analysis: E200.7
Preparation: FLDFLT

II. Receipt/Holding Times:

All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blanks:
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):
Analyzed in accordance with standard operating procedure.

F. Interference Check Sample(s):
All acceptance criteria were met.

G. Serial Dilution(s):
Analyzed in accordance with standard operating procedure.

H. Digestion Exception(s):
None.

I. Analytical Exception(s):
None.

IV. Documentation Exception(s):

None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: _____ Date: 1-4-13

Reviewed by: _____ Date: 1-14-13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: TW-5-121812

Project Name: Kinder Morgan
Sample Date: 12/18/12
Sample Time: 14:20
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: L306101F

Date Received: 12/19/12
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
Dissolved Metals									
Iron	7439-89-6	1	8.00	100	1300		ug/L	E200.7	01/02/13
Manganese	7439-96-5	1	0.73	10.0	49.1		ug/L	E200.7	01/02/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL

1100 NE Circle Blvd., Suite 300
Corvallis, OR 97330
Tel 541-768-3120 Fax 541-752-0276

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: WB4-0102
Project Name: Kinder Morgan
Sample Date: N/A
Sample Time: N/A
Type: QC
Matrix: Water

Lab Information

Lab Sample ID: WB4-0102
Date Received: N/A
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
Metals									
Iron	7439-89-6	1	8.00	100	8.00	U	ug/L	E200.7	01/02/13
Manganese	7439-96-5	1	0.73	10.0	0.73	U	ug/L	E200.7	01/02/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

LCS ID: BS4W0102
Report Revision No.: 0
Dilution Factor: 1

Analyte	CAS#	Spike Amount	Sample Result	Units	%Recovery	Analysis Method	Date Analyzed
Metals							
Iron	7439-89-6	500	478	ug/L	96	E200.7	01/02/13
Manganese	7439-96-5	500	467	ug/L	93	E200.7	01/02/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CASE NARRATIVE
WET CHEMISTRY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: L3061

Project: Kinder Morgan Project #: 436002.01.06

I. Method(s):
Analysis: SM2320B, SM2510B, SM3500-Fe B, SM4500-S D

II. Receipt/Holding Times:
All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blanks:
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):
All acceptance criteria were met.

F. Analytical Exception(s):
None.

IV. Documentation Exception(s):
None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: Janet McGee Date: 1/4/13

Reviewed by: Kathy McCrea Date: 1/4/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Date Received: 12/19/2012
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3061
Analysis Method: SM2320B
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	Alkalinity, Bicarbonate as CaCO3 DL	RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-5-121812	L306101	1	N/A	5.0	34.3		12/27/2012

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 12/19/2012
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3061
Analysis Method: SM2320B
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	Alkalinity, Carbonate as CaCO3 DL	RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-5-121812	L306101	1	N/A	5.0	5.0	U	12/27/2012

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL

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Corvallis, OR 97330
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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 12/19/2012
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3061

Analysis Method: SM2320B
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	Alkalinity, Total as CaCO3 RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-5-121812	L306101	1	N/A	5.0	34.3		12/27/2012
WB1-1227	WB1-1227	1	N/A	5.0	5.0		12/27/2012

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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Tel 541-768-3120 Fax 541-752-0276

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Date Received: 12/19/2012
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3061
Analysis Method: SM2510B
Units: umhos/cm
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	Conductivity RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-5-121812	L306101	1	N/A	10.0	97.0		12/19/2012
WB1-1219	WB1-1219	1	N/A	10.0	10.0	U	12/19/2012

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 12/19/2012
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3061

Analysis Method: SM3500-FE B
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	RL	Ferrous Iron Result	Qualifier	Date Analyzed
General Chemistry							
TW-5-121812	L306101	1	0.039	0.10	0.051	J	12/19/2012 13:42
WB1-1219	WB1-1219	1	0.039	0.10	0.039	U	12/19/2012 12:01

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL

1100 NE Circle Blvd., Suite 300
Corvallis, OR 97330
Tel 541-768-3120, Fax 541-752-0276

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 12/19/2012
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3061
Analysis Method: SM4500-S D
Units: ug/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	RL	Sulfide Result	Qualifier	Date Analyzed
General Chemistry							
TW-5-121812	L306101	1	7.96	25.0	7.96	U	12/20/2012
WB1-1220	WB1-1220	1	7.96	25.0	7.96	U	12/20/2012

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL

1100 NE Circle Blvd., Suite 300
Corvallis, OR 97330

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: L3061

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W1219	Conductivity	384	380	umhos/cm	99	SM2510B	12/19/2012
BS1W1219	Ferrous Iron	1.00	0.90	mg/L	90	SM3500-FE B	12/19/2012
BS1W1220	Sulfide	343	364	ug/L	106	SM4500-S D	12/20/2012
BS1W1227	Alkalinity, Total as CaCO3	48.0	49.6	mg/L	103	SM2320B	12/27/2012

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL

1100 NE Circle Blvd., Suite 300
Corvallis, OR 97330

CASE NARRATIVE
WET CHEMISTRY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: L3061

Project: Kinder Morgan Project #: 436002.01.06

I. Method(s):
Analysis: SM5310B

II. Receipt/Holding Times:
All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blanks:
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):
Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):
None.

IV. Documentation Exception(s):
None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: _____ Date: 1/4/2013

Reviewed by: Kathy McKee Date: 1/4/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Date Received: 12/19/12
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3061
Analysis Method: SM5310B
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	RL	Total Organic Carbon Result	Qualifier	Date Analyzed
General Chemistry							
TW-5-121812	L306101	1	0.047	0.50	1.63		12/20/12
WB1-1220	WB1-1220	1	0.047	0.50	0.26	J	12/20/12

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan Liquid Termminal
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: L3061

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W1220	Total Organic Carbon	2.50	2.81	mg/L	112	SM5310B	12/20/12

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
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CASE NARRATIVE
ION CHROMATOGRAPHY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: L3061

Project: Kinder Morgan Project #: 436002.01.06

I. Method(s):
Analysis: E300.0A

II. Receipt/Holding Times:
All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blanks:
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):
Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):
None.

IV. Documentation Exception(s):
None.

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Prepared by: _____ Date: 1/4/2013

Reviewed by: Kathy McCue Date: 1/4/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Date Received: 12/19/12
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3061
Analysis Method: E300.0A
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	RL	Nitrate-N Result	Qualifier	Date Analyzed
General Chemistry							
TW-5-121812	L306101	1	0.0075	0.10	1.70		12/20/12 06:21
WB1-1219	WB1-1219	1	0.0075	0.10	0.0075	U	12/19/12 22:13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan Liquid Termminal
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: L3061

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W1219	Nitrate-N	3.00	2.72	mg/L	91	E300.0A	12/19/12

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
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CASE NARRATIVE
AUTOMATED CHEMISTRY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: L3061

Project: Kinder Morgan Project #: 436002.01.06

I. Method(s):
Analysis: E350.1

II. Receipt/Holding Times:
All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blanks:
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):
Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):
None.

IV. Documentation Exception(s):
None.

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Prepared by: _____ Date: 1/4/2013

Reviewed by: Kathy McNeil Date: 1/4/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Date Received: 12/19/12
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3061
Analysis Method: E350.1
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	Ammonia-N RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-5-121812	L306101	1	0.014	0.10	0.014	U	01/02/13
WB1-0102	WB1-0102	1	0.014	0.10	0.014	U	01/02/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan Liquid Termminal
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: L3061

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W0102	Ammonia-N	1.16	1.23	mg/L	106	E350.1	01/02/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
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CASE NARRATIVE
HEADSPACE ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: L3061

Project: Kinder Morgan Project #: 436002.01.06

I. Method(s):
Analysis: RSK-175
Preparation: METHOD

II. Receipt/Holding Times:
All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blank(s):
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Laboratory Duplicate Sample(s):
Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):
None.

IV. Documentation Exception(s):
None.

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Prepared by: _____ Date: 1/4/13

Reviewed by: _____ Date: 01/04/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: TW-5-121812
Project Name: Kinder Morgan
Sample Date: 12/18/12
Sample Time: 14:20
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: L306101
Date Received: 12/19/12
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Volatiles									
Methane	74-82-8	1	0.018	0.33	0.037	J	ug/L	RSK-175	12/31/12

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: XB1-1231
Project Name: Kinder Morgan
Sample Date: N/A
Sample Time: N/A
Type: QC
Matrix: Water

Lab Information

Lab Sample ID: XB1-1231
Date Received: N/A
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Volatiles									
Methane	74-82-8	1	0.055	1.00	0.055	U	ug/L	RSK-175	12/31/12

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

LCS ID: BS1X1231
Report Revision No.: 0
Dilution Factor: 1

Analyte	CAS#	Spike Amount	Sample Result	Units	%Recovery	Analysis Method	Date Analyzed
GC Volatiles							
Methane	74-82-8	16.0	16.0	ug/L	100	RSK-175	12/31/12

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
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CH2MHILL Applied Sciences Lab
CHAIN OF CUSTODY RECORD
AND AGREEMENT TO PERFORM SERVICES

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COC #

Project # or Purchase Order #	436002.01.06
Project Name	KINDER MORGAN - LINNTON
Company Name or Home Address/Phone Number	CH2M HILL / PDX
Email Address for Reporting	keith.sheets@ch2m.com
Report Copy to:	eric.aronson@ch2m.com
Turnaround Time	☐24 hours ☐48 hours ☐72 hours ☐7 days ☐14 days ☒21 days (STD)
Drinking Water?	Yes ☐ No ☒
Sample Disposal:	Dispose ☒ Return ☐

Sampling Date	Sampling Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	Matrix AIR	CLIENT SAMPLE ID	TOTAL # OF CONTAINERS	Requested Analytical Method #										Preservative								
									Nitrate, Alkalinity, Conductivity, Ferrous Iron	Ammonia, TOC	Diss. Manganese and Iron			Sulfide	Methane				UNPRES	H_2SO_4	HNO_3	HCl	NaOH	ZnAcNaOH	UNPRES		
12/18/12	14:20		X	X			TW-5-121812	9	X	X	X	–	–	X	X3												

THIS AREA FOR LAB USE ONLY

Lab #	Page	of
43061		

2.6

EPA Tier QC Level: 1 (Screening) 2 3 4

Canister ID	Lab ID
	1

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Volatile Contaminants/Odorous ☐ Biohazard ☐ Other

Relinquished By	BRAD OSTAPOWICZ	12/18/12 1800	**Received By:** Carmen Bell 12/19/12 1030
Sampled By and Title	BRAD OSTAPOWICZ ASSOCIATE ENGINEER	12/18/12 1800	**Relinquished By** (Please sign and print name) Date/Time
Received By	(Please sign and print name)	Date/Time	**Relinquished By** (Please sign and print name) Date/Time
Received By	(Please sign and print name)	Date/Time	**Shipped Via** UPS Fed-Ex Other_____ **Tracking #**

Special Instructions DFSS. Manganese + Iron - Field Filtered

Instructions and Agreement Provisions on Reverse Side

DISTRIBUTION: Original – LAB, Yellow – LAB, Pink – Client
Rev 10/2011 LAB FORM 340

CH2MHILL
Applied Sciences Laboratory (ASL)

Sample Receipt Record

Batch Number: L30601
Client/Project: Kinder Morgan

Date received: 12/19/12
Checked by: CB
Checked by: _____

VERIFICATION OF SAMPLE CONDITIONS (verify all items), HD = Client Hand delivered Samples	NA	YES	NO
Radiological Screening for DoD	✓		
Were custody seals intact and on the outside of the cooler?		✓	
Type of packing material: ~~Ice~~ Blue Ice Bubble wrap		✓	
Was a Chain of Custody (CoC) Provided?		✓	
Was the CoC correctly filled out (If No, document in the SRER)		✓	
Did the CoC list a correct bottle count and the preservative types (Y=OK, N=Corrected on CoC)		✓	
Were the sample containers in good condition (broken or leaking)?		✓	
Containers supplied by ASL?		✓	
Any sample with < 1/2 holding time remaining? If so contact LPM		✓	
Samples have multi-phase? If yes, document on SRER			✓
Was there ice in the cooler? Enter temp. If >6°C contact client/SRER 2.6 °C		✓	
All VOCs free of air bubbles? No, document on SRER	✓	X CB 12-19-12	
pH of all samples checked and met requirements? No, then document in SRER		✓	
Enough sample volume provided for analysis? No, document in SRER		✓	
Did sample labels agree with COC? No, document in SRER		✓	
Dissolved/Soluble metals filtered in the field?		✓	
Dissolved/Soluble metals have sediment in bottom of container? Document in SRER			✓

Sample ID	Reagent	Reagent Lot Number	Volume Added	Initials

ANALYTICAL REPORT

For:
Kinder Morgan

ASL Report #: L3070
Project ID: 436002.01.06
Attn: Keith Sheets/PDX
cc:
Eric Aronson/PDX

Authorized and Released By:

Kathy McKinley

Laboratory Project Manager
Kathy McKinley
(541) 758-0235 ext.23144
January 17, 2013

This data package meets standards requested by client and is not intended or implied to meet any other standard.

All analyses performed by CH2M HILL are clearly indicated. Any subcontracted analyses are included as appended reports as received from the subcontracted laboratory. The results included in this report only relate to the samples listed on the following Sample Cross-Reference page. This report shall not be reproduced except in full, without the written approval of the laboratory.

Any unusual difficulties encountered during the analysis of your samples are discussed in the attached case narratives.

Sample Receipt Comments

We certify that the test results meet all standard ASL requirements.

Sample Cross-Reference

ASL Sample ID	Client Sample ID	Date/Time Collected	Date Received
L307001	TW-4-121912	12/19/12 14:00	12/20/12
L307002	SURFACE-WATER-121912	12/19/12 15:30	12/20/12
L307003	TW-3-121912	12/19/12 16:20	12/20/12

CASE NARRATIVE
HEADSPACE ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: L3070

Project: Kinder Morgan Project #: 436002.01.06

I. Method(s):

Analysis: RSK-175
Preparation: METHOD

II. Receipt/Holding Times:

Samples SURFACE-WATER-121912 , TW-3-121912, and TW-4-121912 were analyzed outside of recommended holding time.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blank(s):
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Laboratory Duplicate Sample(s):
Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):
LCS duplicate was used to assess batch precision.

IV. Documentation Exception(s):

None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: _____ Date: 1/8/13

Reviewed by: _____ Date: 01/08/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: TW-4-121912
Project Name: Kinder Morgan
Sample Date: 12/19/12
Sample Time: 14:00
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: L307001
Date Received: 12/20/12
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Volatiles									
Methane	74-82-8	1	0.016	0.29	16.4	*	ug/L	RSK-175	01/03/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: SURFACE-WATER-121912
Project Name: Kinder Morgan
Sample Date: 12/19/12
Sample Time: 15:30
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: L307002
Date Received: 12/20/12
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Volatiles									
Methane	74-82-8	1	0.020	0.35	2.92	*	ug/L	RSK-175	01/03/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: TW-3-121912
Project Name: Kinder Morgan
Sample Date: 12/19/12
Sample Time: 16:20
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: L307003
Date Received: 12/20/12
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Volatiles									
Methane	74-82-8	1	0.019	0.34	0.13	J*	ug/L	RSK-175	01/03/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: XB1-0103

Project Name: Kinder Morgan
Sample Date: N/A
Sample Time: N/A
Type: QC
Matrix: Water

Lab Information

Lab Sample ID: XB1-0103

Date Received: N/A
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Volatiles									
Methane	74-82-8	1	0.055	1.00	0.055	U	ug/L	RSK-175	01/03/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

LCS ID: BS1X0103
Report Revision No.: 0
Dilution Factor: 1

Analyte	CAS#	Spike Amount	Sample Result	Units	%Recovery	Analysis Method	Date Analyzed
GC Volatiles							
Methane	74-82-8	16.0	16.2	ug/L	102	RSK-175	01/03/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CASE NARRATIVE
METALS ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: L3070

Project: Kinder Morgan Project #: 436002.01.06

I. Method(s):

Analysis: E200.7
Preparation: FLDFLT

II. Receipt/Holding Times:

All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):

All acceptance criteria were met.

B. Calibration Verification(s):

All acceptance criteria were met.

C. Blanks:

All acceptance criteria were met.

D. Laboratory Control Sample(s):

All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):

Analyzed in accordance with standard operating procedure.

F. Interference Check Sample(s):

All acceptance criteria were met.

G. Serial Dilution(s):

Analyzed in accordance with standard operating procedure.

H. Digestion Exception(s):

None.

I. Analytical Exception(s):

None.

IV. Documentation Exception(s):

None.

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Prepared by: Judy D Date: 1-16-13

Reviewed by: R Kaufman Date: 1-17-13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: TW-4-121912
Project Name: Kinder Morgan
Sample Date: 12/19/12
Sample Time: 14:00
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: L307001F
Date Received: 12/20/12
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
Dissolved Metals									
Iron	7439-89-6	1	8.00	100	8.00	U	ug/L	E200.7	01/15/13
Manganese	7439-96-5	1	0.73	10.0	17.6		ug/L	E200.7	01/15/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: SURFACE-WATER-121912
Project Name: Kinder Morgan
Sample Date: 12/19/12
Sample Time: 15:30
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: L307002F
Date Received: 12/20/12
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
Dissolved Metals									
Iron	7439-89-6	1	8.00	100	105		ug/L	E200.7	01/15/13
Manganese	7439-96-5	1	0.73	10.0	9.11	J	ug/L	E200.7	01/15/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: TW-3-121912
Project Name: Kinder Morgan
Sample Date: 12/19/12
Sample Time: 16:20
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: L307003F
Date Received: 12/20/12
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
Dissolved Metals									
Iron	7439-89-6	1	8.00	100	598		ug/L	E200.7	01/15/13
Manganese	7439-96-5	1	0.73	10.0	79.5		ug/L	E200.7	01/15/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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Corvallis, OR 97330
Tel 541-768-3120 Fax 541-752-0276

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: WB1-0114
Project Name: Kinder Morgan
Sample Date: N/A
Sample Time: N/A
Type: QC
Matrix: Water

Lab Information

Lab Sample ID: WB1-0114
Date Received: N/A
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
Metals									
Iron	7439-89-6	1	8.00	100	8.00	U	ug/L	E200.7	01/15/13
Manganese	7439-96-5	1	0.73	10.0	0.73	U	ug/L	E200.7	01/15/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

LCS ID: BS1W0114
Report Revision No.: 0
Dilution Factor: 1

Analyte	CAS#	Spike Amount	Sample Result	Units	%Recovery	Analysis Method	Date Analyzed
Metals							
Iron	7439-89-6	500	507	ug/L	101	E200.7	01/15/13
Manganese	7439-96-5	500	473	ug/L	95	E200.7	01/15/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
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CASE NARRATIVE
AUTOMATED CHEMISTRY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: L3070

Project: Kinder Morgan Project #: 436002.01.06

I. Method(s):
Analysis: E350.1

II. Receipt/Holding Times:
All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blanks:
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):
Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):
None.

IV. Documentation Exception(s):
None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: _____ Date: 1/8/2013

Reviewed by: Kathy McCoy Date: 1/10/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 12/20/12
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3070

Analysis Method: E350.1
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	Ammonia-N RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-4-121912	L307001	1	0.014	0.10	0.014	U	12/27/12
SURFACE-WATER-121912	L307002	1	0.014	0.10	0.014	U	12/27/12
TW-3-121912	L307003	1	0.014	0.10	0.40		12/27/12
WB1-1227	WB1-1227	1	0.014	0.10	0.014	U	12/27/12

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: L3070

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W1227	Ammonia-N	1.16	1.23	mg/L	106	E350.1	12/27/12

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
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CASE NARRATIVE
ION CHROMATOGRAPHY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: L3070

Project: Kinder Morgan Project #: 436002.01.06

I. Method(s):
Analysis: E300.0A

II. Receipt/Holding Times:
All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blanks:
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):
Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):
None.

IV. Documentation Exception(s):
None.

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Prepared by: _____ Date: 1/15/2013

Reviewed by: _____ Date: 1/17/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 12/20/12
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3070

Analysis Method: E300.0A
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	RL	Nitrate-N Result	Qualifier	Date Analyzed
General Chemistry							
TW-4-121912	L307001	1	0.0075	0.10	0.0075	U	12/20/12 21:02
SURFACE-WATER-121912	L307002	1	0.0075	0.10	0.16		12/20/12 21:21
TW-3-121912	L307003	1	0.0075	0.10	0.12		12/20/12 21:42
WB1-1220	WB1-1220	1	0.0075	0.10	0.0075	U	12/20/12 15:58

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: L3070

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W1220	Nitrate-N	3.00	2.79	mg/L	93	E300.0A	12/20/12

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CASE NARRATIVE
WET CHEMISTRY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: L3070

Project: Kinder Morgan Project #: 436002.01.06

I. Method(s):
Analysis: SM5310B

II. Receipt/Holding Times:
All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blanks:
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):
Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):
None.

IV. Documentation Exception(s):
None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: _____ Date: 1/4/2013

Reviewed by: Kathley McKee Date: 1/4/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 12/20/12

Type: See C.O.C.

Matrix: Water

Lab Information

Lab Batch ID: L3070

Analysis Method: SM5310B

Units: mg/L

Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	Total Organic Carbon DL	RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-4-121912	L307001	1	0.047	0.50	3.69		12/21/12
SURFACE-WATER-121912	L307002	1	0.047	0.50	2.13		12/21/12
TW-3-121912	L307003	1	0.047	0.50	2.57		12/21/12
WB2-1220	WB2-1220	1	0.047	0.50	0.047	U	12/21/12

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan Liquid Termminal
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: L3070

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS2W1220	Total Organic Carbon	2.50	2.09	mg/L	84	SM5310B	12/21/12

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
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CASE NARRATIVE
WET CHEMISTRY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: L3070

Project: Kinder Morgan Project #: 436002.01.06

I. Method(s):
Analysis: SM2320B, SM2510B, SM3500-Fe B, SM4500S2 D

II. Receipt/Holding Times:
All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blanks:
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):
All acceptance criteria were met.

F. Analytical Exception(s):
None.

IV. Documentation Exception(s):
None.

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Prepared by: Jamil McGee Date: 1/4/13

Reviewed by: Kathy McKnight Date: 1/6/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 12/20/12
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3070

Analysis Method: SM2320B
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	Alkalinity, Bicarbonate as CaCO3 DL	RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-4-121912	L307001	1	N/A	5.0	102		12/27/12
SURFACE-WATER-121912	L307002	1	N/A	5.0	23.9		12/27/12
TW-3-121912	L307003	1	N/A	5.0	107		12/27/12

U=Not detected at specified reporting limit
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E=Estimated value above calibration range
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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 12/20/12
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3070

Analysis Method: SM2320B
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	Alkalinity, Carbonate as CaCO3 DL	RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-4-121912	L307001	1	N/A	5.0	5.0	U	12/27/12
SURFACE-WATER-121912	L307002	1	N/A	5.0	5.0	U	12/27/12
TW-3-121912	L307003	1	N/A	5.0	5.0	U	12/27/12

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 12/20/12
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3070

Analysis Method: SM2320B
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	Alkalinity, Total as CaCO3 RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-4-121912	L307001	1	N/A	5.0	102		12/27/12
SURFACE-WATER-121912	L307002	1	N/A	5.0	23.9		12/27/12
TW-3-121912	L307003	1	N/A	5.0	107		12/27/12
WB1-1227	WB1-1227	1	N/A	5.0	5.0		12/27/12

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 12/20/12
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3070

Analysis Method: SM2510B
Units: umhos/cm
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	Conductivity RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-4-121912	L307001	1	N/A	10.0	218		01/02/13
SURFACE-WATER-121912	L307002	1	N/A	10.0	70.9		01/02/13
TW-3-121912	L307003	1	N/A	10.0	220		01/02/13
WB1-0102	WB1-0102	1	N/A	10.0	10.0	U	01/02/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 12/20/12
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3070

Analysis Method: SM3500-FE B
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	RL	Ferrous Iron Result	Qualifier	Date Analyzed
General Chemistry							
TW-4-121912	L307001	1	0.039	0.10	0.045	J	12/20/12 13:37
SURFACE-WATER-121912	L307002	1	0.039	0.10	0.039	U	12/20/12 13:41
TW-3-121912	L307003	1	0.039	0.10	0.039	U	12/20/12 13:46
WB1-1220	WB1-1220	1	0.039	0.10	0.039	U	12/20/12 13:22

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 12/20/12
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: L3070

Analysis Method: SM4500-S D
Units: ug/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	Sulfide RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-4-121912	L307001	1	7.96	25.0	7.96	U	12/20/12
SURFACE-WATER-121912	L307002	1	7.96	25.0	54.1		12/20/12
TW-3-121912	L307003	1	7.96	25.0	18.1	J	12/20/12
WB1-1220	WB1-1220	1	7.96	25.0	7.96	U	12/20/12

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: L3070

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W1220	Ferrous Iron	1.00	1.01	mg/L	101	SM3500-FE B	12/20/12
BS1W1220	Sulfide	343	364	ug/L	106	SM4500-S D	12/20/12
BS1W1227	Alkalinity, Total as CaCO3	48.0	49.6	mg/L	103	SM2320B	12/27/12
BS1W0102	Conductivity	384	379	umhos/cm	99	SM2510B	01/02/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2MHILL Applied Sciences Lab
CHAIN OF CUSTODY RECORD
AND AGREEMENT TO PERFORM SERVICES

1100 NE Circle Blvd., Suite 300
Corvallis, OR 97330
(541) 768-3120 FAX (541) 752-0276

COC #

Project # or Purchase Order # 436002.01.06

Project Name KINDER MORGAN-LAYNTON

Company Name or Home Address/Phone Number
CH2M HILL/PDX

Email Address for Reporting: keith.sheets@ch2m.com
Report Copy to: eric.aronson@ch2m.com

Turnaround Time
☐24 hours ☐48 hours ☐72 hours
☐7 days ☐14 days ☒21 days (STD)

Drinking Water? Yes ☐ No ☒
Sample Disposal: Dispose ☒ Return ☐

Sampling		Type		Matrix				TOTAL # OF CONTAINERS	Requested Analytical Method #									THIS AREA FOR LAB USE ONLY
Date	Time	COMP	GRAB	WATER	SOIL	AIR	CLIENT SAMPLE ID		Nitrate, Alkalinity, Conductivity, Ferrous Iron	Ammonia, TOC	DISS. MANGANESE AND IRON			SULFIDE	Methane			Lab # L3070 Page of
									Preservative									
									UNPRES	H_2SO_4	HNO_3	HCl	NaOH	ZnAcNaOH	UNPRES			EPA Tier QC Level 1 (Screening) 2 3 4
																		Canister ID / Lab ID
12/19/12	1400		X	X			TW-4-121912	9	X1	X	X1			X1	X3			1
12/19/12	1530		X	X			SURFACE-WATER-121912	9	X1	X	X1			X1	X3			2
12/19/12	1620		X	X			TW-3-121912	9	X1	X	X1			X1	X3			3

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Volatile Contaminants/Odorous ☐ Biohazard ☐ Other

Relinquished By: BRAD OSTAPKOWICZ	Date/Time 12/19/12 20:00	Received By:	Date/Time
Sampled By and Title (Please sign and print name): BRAD OSTAPKOWICZ ASSOCIATE ENGINEER	Date/Time 12/19/12 20:00	Relinquished By (Please sign and print name)	Date/Time
Received By: Carmen Bell	Date/Time 12/20/12 1001	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name)	Date/Time	Shipped Via UPS Fed-Ex Other COURIER	Tracking #

Special Instructions: DISS. MANGANESE AND IRON - FIELD FILTERED

Instructions and Agreement Provisions on Reverse Side

DISTRIBUTION: Original – LAB, Yellow – LAB, Pink – Client
Rev 10/2011 LAB FORM 340

CH2MHILL
Applied Sciences Laboratory (ASL)

Sample Receipt Record

Batch Number: L3070
Client/Project: Kinder Morgan

Date received: 12/20/12
Checked by: CB
Checked by: _____

VERIFICATION OF SAMPLE CONDITIONS (verify all items), HD = Client Hand delivered Samples	NA	YES	NO
Radiological Screening for DoD	✓		
Were custody seals intact and on the outside of the cooler?		✓	
Type of packing material: (Ice) Blue Ice Bubble wrap			
Was a Chain of Custody (CoC) Provided?		✓	
Was the CoC correctly filled out (If No, document in the SRER)		✓	
Did the CoC list a correct bottle count and the preservative types (Y=OK, N=Corrected on CoC)		N ✓	
Were the sample containers in good condition (broken or leaking)?		✓	
Containers supplied by ASL?		✓	
Any sample with < 1/2 holding time remaining? If so contact LPM			✓
Samples have multi-phase? If yes, document on SRER			✓
Was there ice in the cooler? Enter temp. If >6°C contact client/SRER 1.6 °C		✓	
All VOCs free of air bubbles? No, document on SRER	✓	•	
pH of all samples checked and met requirements? No, then document in SRER		✓	
Enough sample volume provided for analysis? No, document in SRER		✓	
Did sample labels agree with COC? No, document in SRER		✓	
Dissolved/Soluble metals filtered in the field?		✓	
Dissolved/Soluble metals have sediment in bottom of container? Document in SRER			✓

Sample ID	Reagent	Reagent Lot Number	Volume Added	Initials

ANALYTICAL REPORT

For:
Kinder Morgan

ASL Report #: M1070
Project ID: 467443.01.01
Attn: Keith Sheets/PDX
cc:
Eric Aronson/PDX

Authorized and Released By:

Laboratory Project Manager
Ben Thompson
(541) 758-0235 ext.23132
February 06, 2013

This data package meets standards requested by client and is not intended or implied to meet any other standard.

All analyses performed by CH2M HILL are clearly indicated. Any subcontracted analyses are included as appended reports as received from the subcontracted laboratory. The results included in this report only relate to the samples listed on the following Sample Cross-Reference page. This report shall not be reproduced except in full, without the written approval of the laboratory.

Any unusual difficulties encountered during the analysis of your samples are discussed in the attached case narratives.

Sample Receipt Comments

We certify that the test results meet all standard ASL requirements.

Sample Cross-Reference

ASL Sample ID	Client Sample ID	Date/Time Collected	Date Received
M107001	TW-1-011513	01/15/13 11:30	01/16/13
M107002	TW-2-011513	01/15/13 16:10	01/16/13

CASE NARRATIVE
HEADSPACE ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: M1070

Project: Kinder Morgan Project #: 467443.01.01

I. Method(s):

Analysis: RSK-175
Preparation: METHOD

II. Receipt/Holding Times:

All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):

All acceptance criteria were met.

B. Calibration Verification(s):

All acceptance criteria were met.

C. Blank(s):

All acceptance criteria were met.

D. Laboratory Control Sample(s):

All acceptance criteria were met.

E. Laboratory Duplicate Sample(s):

Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):

None.

IV. Documentation Exception(s):

None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: _____ Date: 1/22/13

Reviewed by: _____ Date: 01/30/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: TW-1-011513
Project Name: Kinder Morgan
Sample Date: 01/15/13
Sample Time: 11:30
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: M107001
Date Received: 01/16/13
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Volatiles									
Methane	74-82-8	1	0.033	0.60	1080		ug/L	RSK-175	01/16/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
'=See case narrative

CH2M HILL ASL

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Corvallis, OR 97330
Tel 541-768-3120 Fax 541-752-0276

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: XB1-0116

Project Name: Kinder Morgan
Sample Date: N/A
Sample Time: N/A
Type: QC
Matrix: Water

Lab Information

Lab Sample ID: XB1-0116

Date Received: N/A
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Volatiles									
Methane	74-82-8	1	0.055	1.00	0.055	U	ug/L	RSK-175	01/16/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL

SO130122-15:28-M1070-E

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Tel 541-768-3120 Fax 541-752-0276

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

LCS ID: BS1X0116
Report Revision No.: 0
Dilution Factor: 1

Analyte	CAS#	Spike Amount	Sample Result	Units	%Recovery	Analysis Method	Date Analyzed
GC Volatiles							
Methane	74-82-8	16.0	16.0	ug/L	100	RSK-175	01/16/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CASE NARRATIVE
METALS ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: M1070

Project: Kinder Morgan Project #: 467443.01.01

I. Method(s):

Analysis: E200.7
Preparation: FLDFLT

II. Receipt/Holding Times:

All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):

All acceptance criteria were met.

B. Calibration Verification(s):

All acceptance criteria were met.

C. Blanks:

All acceptance criteria were met.

D. Laboratory Control Sample(s):

All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):

Analyzed in accordance with standard operating procedure.

F. Interference Check Sample(s):

All acceptance criteria were met.

G. Serial Dilution(s):

Analyzed in accordance with standard operating procedure.

H. Digestion Exception(s):

None.

I. Analytical Exception(s):

None.

IV. Documentation Exception(s):

None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: Emily Clark Date: 1/29/13

Reviewed by: Judy S Date: 1-30-13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: TW-1-011513

Project Name: Kinder Morgan
Sample Date: 01/15/13
Sample Time: 11:30
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: M107001F

Date Received: 01/16/13
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
Dissolved Metals									
Iron	7439-89-6	1	8.00	100	28300		ug/L	E200.7	01/25/13
Manganese	7439-96-5	1	0.73	10.0	824		ug/L	E200.7	01/25/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL

EC130129-17:17-M1070-M

1100 NE Circle Blvd., Suite 300
Corvallis, OR 97330
Tel 541-768-3120 Fax 541-752-0276

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: WB2-0122
Project Name: Kinder Morgan
Sample Date: N/A
Sample Time: N/A
Type: QC
Matrix: Water

Lab Information

Lab Sample ID: WB2-0122
Date Received: N/A
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
Metals									
Iron	7439-89-6	1	8.00	100	8.00	U	ug/L	E200.7	01/25/13
Manganese	7439-96-5	1	0.73	10.0	0.73	U	ug/L	E200.7	01/25/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL

EC130129-17:17-M1070-M

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Tel 541-768-3120 Fax 541-752-0276

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

LCS ID: BS2W0122
Report Revision No.: 0
Dilution Factor: 1

Analyte	CAS#	Spike Amount	Sample Result	Units	%Recovery	Analysis Method	Date Analyzed
Metals							
Iron	7439-89-6	500	522	ug/L	104	E200.7	01/25/13
Manganese	7439-96-5	500	489	ug/L	98	E200.7	01/25/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CASE NARRATIVE
AUTOMATED CHEMISTRY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: M1070

Project: Kinder Morgan Project #: 467443.01.01

I. Method(s):
Analysis: E350.1

II. Receipt/Holding Times:
All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blanks:
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):
Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):
None.

IV. Documentation Exception(s):
None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: _____ Date: 1/25/2013

Reviewed by: _____ Date: 01/28/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 01/16/13
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: M1070
Analysis Method: E350.1
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	Ammonia-N RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-1-011513	M107001	1	0.014	0.10	0.35		01/23/13
TW-2-011513	M107002	1	0.014	0.10	0.24		01/23/13
WB1-0123	WB1-0123	1	0.014	0.10	0.014	U	01/23/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL

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Corvallis, OR 97330
Tel 541-768-3120 Fax 541-752-0276

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: M1070

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W0123	Ammonia-N	1.16	1.17	mg/L	101	E350.1	01/23/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CASE NARRATIVE
ION CHROMATOGRAPHY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: M1070

Project: Kinder Morgan Project #: 467443.01.01

I. Method(s):
Analysis: E300.0A

II. Receipt/Holding Times:
All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blanks:
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):
Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):
None.

IV. Documentation Exception(s):
None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: _____ Date: 1/26/2013

Reviewed by: _____ Date: 01/28/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 01/16/13
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: M1070

Analysis Method: E300.0A
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	RL	Nitrate-N Result	Qualifier	Date Analyzed
General Chemistry							
TW-1-011513	M107001	1	0.0077	0.10	0.0077	U	01/17/13 00:29
TW-2-011513	M107002	1	0.0077	0.10	0.0077	U	01/17/13 00:53
WB1-0116	WB1-0116	1	0.0077	0.10	0.0077	U	01/16/13 15:50

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL

YL130126-19:57-M1070-W

1100 NE Circle Blvd., Suite 300
Corvallis, OR 97330
Tel 541-768-3120 Fax 541-752-0276

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: M1070

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W0116	Nitrate-N	3.00	2.74	mg/L	91	E300.0A	01/16/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL

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Corvallis, OR 97330
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CASE NARRATIVE
WET CHEMISTRY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: M1070

Project: Kinder Morgan Project #: 467443.01.01

I. Method(s):
Analysis: SM5310B

II. Receipt/Holding Times:
All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blanks:
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):
Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):
None.

IV. Documentation Exception(s):
None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: _____ Date: 1/22/2013

Reviewed by: Kathy McKim Date: 1/23/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 01/16/13
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: M1070

Analysis Method: SM5310B
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	Total Organic Carbon DL	RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-1-011513	M107001	1	0.047	0.50	1.63		01/18/13
TW-2-011513	M107002	1	0.047	0.50	6.51		01/18/13
WB1-0118	WB1-0118	1	0.047	0.50	0.11	J	01/18/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL

YL130122-11:42-M1070-W

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Corvallis, OR 97330
Tel 541-768-3120 Fax 541-752-0276

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: M1070

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W0118	Total Organic Carbon	5.00	4.81	mg/L	96	SM5310B	01/18/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL

YL130122-11:42-M1070-W

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CASE NARRATIVE
WET CHEMISTRY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: M1070

Project: Kinder Morgan Project #: 467443.01.01

I. Method(s):
Analysis: SM2320B, SM2510B, SM3500-Fe B, SM4500-S D

II. Receipt/Holding Times:
All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blanks:
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):
All acceptance criteria were met.

F. Analytical Exception(s):
None.

IV. Documentation Exception(s):
None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: Jamal McCray Date: 1/28/13

Reviewed by: Kathy McCarty Date: 1/29/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 01/16/13
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: M1070
Analysis Method: SM2320B
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	Alkalinity, Total as CaCO3 RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-1-011513	M107001	1	N/A	5.0	207		01/18/13
WB1-0118	WB1-0118	1	N/A	5.0	5.0		01/18/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 01/16/13
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: M1070
Analysis Method: SM2510B
Units: umhos/cm
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	Conductivity RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-1-011513	M107001	1	N/A	10.0	387		01/18/13
WB1-0118	WB1-0118	1	N/A	10.0	10.0	U	01/18/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 01/16/13
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: M1070
Analysis Method: SM3500-FE B
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	RL	Ferrous Iron Result	Qualifier	Date Analyzed
General Chemistry							
TW-1-011513	M107001	25	0.98	2.50	11.7		01/16/13 16:12
TW-2-011513	M107002	25	0.98	2.50	19.5		01/16/13 17:26
WB1-0116	WB1-0116	1	0.039	0.10	0.039	U	01/16/13 15:37

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 01/16/13
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: M1070

Analysis Method: SM4500-S D
Units: ug/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	Sulfide RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-1-011513	M107001	1	7.96	25.0	38.2		01/21/13
TW-2-011513	M107002	1	7.96	25.0	16.5	J	01/21/13
WB1-0121	WB1-0121	1	7.96	25.0	7.96	U	01/21/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: M1070

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W0116	Ferrous Iron	1.00	0.83	mg/L	83	SM3500-FE B	01/16/13
BS1W0118	Alkalinity, Total as CaCO3	48.0	48.6	mg/L	101	SM2320B	01/18/13
BS1W0118	Conductivity	384	375	umhos/cm	98	SM2510B	01/18/13
BS1W0121	Sulfide	331	350	ug/L	106	SM4500-S D	01/21/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2MHILL Applied Sciences Lab
CHAIN OF CUSTODY RECORD
AND AGREEMENT TO PERFORM SERVICES

1100 NE Circle Blvd., Suite 300
Corvallis, OR 97330
(541) 768-3120 FAX (541) 752-0276

COC # _____

Project # or Purchase Order # 467443.01.01

Project Name KINDER MORGAN - LAWTON

Company Name or Home Address/Phone Number
CH2M HILL / POX

Email Address for Reporting: keith.sheetz@ch2m.com
Report Copy to: eric.aronson@ch2m.com

Turnaround Time: ☐24 hours ☐48 hours ☐72 hours ☐7 days ☐14 days ☒21 days (STD)

Drinking Water? Yes ☐ No ☒

Sample Disposal: Dispose ☒ Return ☐

Sampling Date	Sampling Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	Matrix AIR	CLIENT SAMPLE ID	TOTAL # OF CONTAINERS	Requested Analytical Method # / Preservative: UNPRES	H_2SO_4	HNO_3	HCl	NaOH	ZnAcNaOH	Unpres.
									N: Nitrate, Alkalinity, Conductivity, Ferrous Iron	Ammonia, TOC	Diss. Manganese and Iron			Sulfide	Methane
									(1)	(1 800 2 TOC)	(1)			(1)	(3)
01/15/13	1130		X	X			TW-1-011513	9	X	X	X			X	X
01/15/13	1610		X	X			TW-2-011513	9	X	X	X			X	X

THIS AREA FOR LAB USE ONLY

Lab # M1670 | Page | of

EPA Tier QC Level: 1 (Screening) 2 3 4

Canister ID	Lab ID
	1
	2

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Volatile Contaminants/Odorous ☐ Biohazard ☐ Other _____

Relinquished By: BRAD OSTERKAMP	Date/Time: 01/15/13 1900	Received By:	Date/Time
Sampled By and Title: BRAD OSTERKAMP - ASSOCIATE ENGINEER	Date/Time: 01/15/13 1900	Relinquished By (Please sign and print name)	Date/Time
Received By: Carmen Bell	Date/Time: 1/16/13 @1100	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name)	Date/Time	Shipped Via: UPS Fed-Ex Other COURIER	Tracking #

Special Instructions: Diss. Manganese and Iron - Field Filtered

Instructions and Agreement Provisions on Reverse Side

DISTRIBUTION: Original – LAB, Yellow – LAB, Pink – Client
Rev 10/2011 LAB FORM 340

CH2MHILL
Applied Sciences Laboratory (ASL)

Sample Receipt Record

Batch Number: M070
Client/Project: Kinder Morgan

Date received: 1-16-13
Checked by: CB
Checked by: _____

VERIFICATION OF SAMPLE CONDITIONS (verify all items), HD = Client Hand delivered Samples	NA	YES	NO
Radiological Screening for DoD	✓		
Were custody seals intact and on the outside of the cooler?		✓	
Type of packing material: (Ice) Blue Ice Bubble wrap		✓	
Was a Chain of Custody (CoC) Provided?		✓	
Was the CoC correctly filled out (If No, document in the SRER)		✓	
Did the CoC list a correct bottle count and the preservative types (Y=OK, N=Corrected on CoC)		N ✓	
Were the sample containers in good condition (broken or leaking)?		✓	
Containers supplied by ASL?		✓	
Any sample with < 1/2 holding time remaining? If so contact LPM		✓	✓ CB ROS 1-16-13
Samples have multi-phase? If yes, document on SRER			✓
Was there ice in the cooler? Enter temp. If >6°C contact client/SRER 1.8 °C		✓	

All VOCs free of air bubbles? No, document on SRER	✓	✓ CB ROS 1-16-13	
pH of all samples checked and met requirements? No, then document in SRER		✓	
Enough sample volume provided for analysis? No, document in SRER		✓	
Did sample labels agree with COC? No, document in SRER		✓	
Dissolved/Soluble metals filtered in the field?		✓	
Dissolved/Soluble metals have sediment in bottom of container? Document in SRER			✓

Sample ID	Reagent	Reagent Lot Number	Volume Added	Initials

ANALYSIS CHANGE ORDER

Requested By: Brad O /PDX Date Requested: 1/16/13

Approved By: Kathy M /CVO Date Approved: 1/16/13

Affected Batch/Samples: M1070

Client/Project: Kinder Morgan

Description of Problem: TV-2 (M1070-2) on HOLD except short HT ~~tests~~ (ferrous Fe, nitrate)

Corrective Action Taken: Attach to COC and delete HOLD analyses.

LIMS USE ONLY

Entered into LIMS (Name, date) Carmen BLM 1/16/13

Verified/Reviewed:

Comment:

DISTRIBUTION

O	LIMS	R. McMorris	(distribute to staff)
O	QA-Coordinator	G. Collins	(distribute to staff)
O	Data Packaging	D. Hardy	(distribute to staff)
O	Client Services	K. McKinley	(distribute to staff)
O	Inorganics	M. Bos	(distribute to staff)
O	Cations	M. Bos	(distribute to staff)
O	Organics	M. Schaadt	(distribute to staff)
O	Air Toxics	M. Schaadt	(distribute to staff)
O	Treatability	T. Maloney	(distribute to staff)
O	Bioassay	B. Muckey	(distribute to staff)

O INCLUDE IN FINAL REPORT

McKinley, Kathy/CVO

From: Ostapkowicz, Brad/PDX
Sent: Thursday, January 17, 2013 4:54 PM
To: McKinley, Kathy/CVO
Subject: Kinder Morgan - Linnton

Kathy,
I am following up on the samples for Kinder Morgan-Linnton. I have you holding sample TW-2. We should now whether we will analyze for all the analytes on Monday. If we have analytes that will go out of hold before then, we can analyze them.

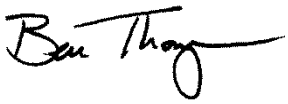
Brad

ANALYTICAL REPORT

For:
Kinder Morgan

ASL Report #: M1070
Project ID: 467443.01.01
Attn: Keith Sheets/PDX
cc:
Eric Aronson/PDX

Authorized and Released By:



Laboratory Project Manager
Ben Thompson
(541) 758-0235 ext.23132
February 22, 2013

This data package meets standards requested by client and is not intended or implied to meet any other standard.

All analyses performed by CH2M HILL are clearly indicated. Any subcontracted analyses are included as appended reports as received from the subcontracted laboratory. The results included in this report only relate to the samples listed on the following Sample Cross-Reference page. This report shall not be reproduced except in full, without the written approval of the laboratory.

Any unusual difficulties encountered during the analysis of your samples are discussed in the attached case narratives.

Sample Receipt Comments

We certify that the test results meet all standard ASL requirements.

Sample Cross-Reference

ASL Sample ID	Client Sample ID	Date/Time Collected	Date Received
M107001	TW-1-011513	01/15/13 11:30	01/16/13
M107002	TW-2-011513	01/15/13 16:10	01/16/13

ANALYSIS CHANGE ORDER

Requested By:____Brad Ostapkowicz/PDX___Date 2/13/2013

Approved By:___Kathy McKinley_____Date Approved:___2/13/2013_____

Affected Batch/Samples:___M1070_____

Client/Project:_____Kinder Morgan_____

Description of Problem:_____Original request had samples on HOLD. Analyze now past HT._____

Actions Taken:____Log in to LIMS and invoice client _____Alkalinity, Ammonia, TOC, Dissolved Fe and Mn, Methane,Conductivity_____ cancel 2/15/13 per client

LIMS USE ONLY

Entered into LIMS (Name, date)Carmen Bell 2/15/13.

Verified/Reviewed:_____Kathy McKern 2/18/13

Comment:_____

☐ xxxx **INCLUDE THIS FORM IN FINAL REPORT**

DISTRIBUTION

Copy this form and distribute to all affected staff:

- Sample Receiving
- Analysts
- Section Leads
- LPMs
- QAO
- Data Packaging/Reporting

McKinley, Kathy/CVO

From: Ostapkowicz, Brad/PDX
Sent: Wednesday, February 13, 2013 2:44 PM
To: McKinley, Kathy/CVO
Subject: Kinder Morgan - Linnton

Kathy,
Can you go ahead and analyze those remaining constituents for TW-2 (the ones in hold times and also out of hold times)? The ASL number was M1070.

Thanks,
Brad

CASE NARRATIVE
HEADSPACE ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: M1070

Project: Kinder Morgan Project #: 467443.01.01

I. Method(s):

Analysis: RSK-175
Preparation: METHOD

II. Receipt/Holding Times:

All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):

All acceptance criteria were met.

B. Calibration Verification(s):

All acceptance criteria were met.

C. Blank(s):

All acceptance criteria were met.

D. Laboratory Control Sample(s):

All acceptance criteria were met.

E. Laboratory Duplicate Sample(s):

Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):

None.

IV. Documentation Exception(s):

None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: _____ Date: 2/13/13

Reviewed by: _____ Date: 2/14/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: TW-2-011513
Project Name: Kinder Morgan
Sample Date: 01/15/13
Sample Time: 16:10
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: M107002
Date Received: 01/16/13
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Volatiles									
Methane	74-82-8	1	0.093	1.67	2060		ug/L	RSK-175	01/16/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL
1100 NE Circle Blvd., Suite 300
Corvallis, OR 97330
Tel 541-768-3120 Fax 541-752-0276

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: XB1-0116

Project Name: Kinder Morgan
Sample Date: N/A
Sample Time: N/A
Type: QC
Matrix: Water

Lab Information

Lab Sample ID: XB1-0116

Date Received: N/A
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Volatiles									
Methane	74-82-8	1	0.055	1.00	0.055	U	ug/L	RSK-175	01/16/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL

SO130213-16:43-M1070-E1

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

LCS ID: BS1X0116
Report Revision No.: 0
Dilution Factor: 1

Analyte	CAS#	Spike Amount	Sample Result	Units	%Recovery	Analysis Method	Date Analyzed
GC Volatiles							
Methane	74-82-8	16.0	16.0	ug/L	100	RSK-175	01/16/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CASE NARRATIVE
METALS ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: M1070

Project: Kinder Morgan Project #: 467443.01.01

I. Method(s):

Analysis: E200.7
Preparation: FLDFLT

II. Receipt/Holding Times:

All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):

All acceptance criteria were met.

B. Calibration Verification(s):

All acceptance criteria were met.

C. Blanks:

All acceptance criteria were met.

D. Laboratory Control Sample(s):

All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):

Analyzed in accordance with standard operating procedure.

F. Interference Check Sample(s):

All acceptance criteria were met.

G. Serial Dilution(s):

Analyzed in accordance with standard operating procedure.

H. Digestion Exception(s):

None.

I. Analytical Exception(s):

None.

IV. Documentation Exception(s):

None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: Emily Clark Date: 2/20/13

Reviewed by: [signature] Date: 2/22/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: TW-1-011513

Project Name: Kinder Morgan
Sample Date: 01/15/13
Sample Time: 11:30
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: M107001F

Date Received: 01/16/13
Report Revision No.: 1

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
Dissolved Metals									
Iron	7439-89-6	1	8.00	100	28300		ug/L	E200.7	01/25/13
Manganese	7439-96-5	1	0.73	10.0	824		ug/L	E200.7	01/25/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: TW-2-011513

Project Name: Kinder Morgan
Sample Date: 01/15/13
Sample Time: 16:10
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: M107002F

Date Received: 01/16/13
Report Revision No.: 1

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
Dissolved Metals									
Iron	7439-89-6	5	40.0	500	41300		ug/L	E200.7	02/19/13
Manganese	7439-96-5	5	3.66	50.0	13400		ug/L	E200.7	02/19/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: WB1-0219

Project Name: Kinder Morgan
Sample Date: N/A
Sample Time: N/A
Type: QC
Matrix: Water

Lab Information

Lab Sample ID: WB1-0219

Date Received: N/A
Report Revision No.: 1

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
Metals									
Iron	7439-89-6	1	8.00	100	8.00	U	ug/L	E200.7	02/19/13
Manganese	7439-96-5	1	0.73	10.0	0.73	U	ug/L	E200.7	02/19/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: WB2-0122
Project Name: Kinder Morgan
Sample Date: N/A
Sample Time: N/A
Type: QC
Matrix: Water

Lab Information

Lab Sample ID: WB2-0122
Date Received: N/A
Report Revision No.: 1

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
Dissolved Metals									
Iron	7439-89-6	1	8.00	100	8.00	U	ug/L	E200.7	01/25/13
Manganese	7439-96-5	1	0.73	10.0	0.73	U	ug/L	E200.7	01/25/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

LCS ID: BS1W0219
Report Revision No.: 1
Dilution Factor: 1

Analyte	CAS#	Spike Amount	Sample Result	Units	%Recovery	Analysis Method	Date Analyzed
Metals							
Iron	7439-89-6	500	542	ug/L	108	E200.7	02/19/13
Manganese	7439-96-5	500	501	ug/L	100	E200.7	02/19/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

LCS ID: BS2W0122
Report Revision No.: 1
Dilution Factor: 1

Analyte	CAS#	Spike Amount	Sample Result	Units	%Recovery	Analysis Method	Date Analyzed
Metals							
Iron	7439-89-6	500	522	ug/L	104	E200.7	01/25/13
Manganese	7439-96-5	500	489	ug/L	98	E200.7	01/25/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CASE NARRATIVE
GENERAL CHEMISTRY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: M1070

Project: Kinder Morgan Project #: 467443.01.01

I. Method(s):
Analysis: SM2510B

II. Receipt/Holding Times:
Sample TW-2-011513 for Conductivity was analyzed outside of holding time.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blanks:
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):
Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):
None.

IV. Documentation Exception(s):
None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: Jamal McCreary Date: 2/20/13

Reviewed by: Kathy McKeon Date: 2/20/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 01/16/2013
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: M1070

Analysis Method: SM2510B
Units: umhos/cm
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	Conductivity RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-1-011513	M107001	1	N/A	10.0	387		01/18/2013
TW-2-011513	M107002	1	N/A	10.0	928	*	02/16/2013
WB1-0118	WB1-0118	1	N/A	10.0	10.0	U	01/18/2013
WB1-0216	WB1-0216	1	N/A	10.0	10.0	U	02/16/2013

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: M1070

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W0118	Conductivity	384	375	umhos/cm	98	SM2510B	01/18/2013
BS1W0216	Conductivity	384	369	umhos/cm	96	SM2510B	02/16/2013

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2MHILL Applied Sciences Lab
CHAIN OF CUSTODY RECORD
AND AGREEMENT TO PERFORM SERVICES

1100 NE Circle Blvd., Suite 300
Corvallis, OR 97330
(541) 768-3120 FAX (541) 752-0276

COC #

Project # or Purchase Order #	467443.01.01
Project Name	KINDER MORGAN - LARIMER
Company Name or Home Address/Phone Number	CH2M HILL / PDX
Email Address for Reporting	keith.sheets@ch2m.com
Report Copy to:	eric.aronson@ch2m.com
Turnaround Time	☐24 hours ☐48 hours ☐72 hours ☐7 days ☐14 days ☒21 days (STD)
Drinking Water?	Yes ☐ No ☒
Sample Disposal:	Dispose ☒ Return ☐

Sampling Date	Sampling Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	Matrix AIR	CLIENT SAMPLE ID	TOTAL # OF CONTAINERS	Requested Analytical Method #										Preservative								
									Nitrate, Alkalinity, Conductivity, Ferrous Iron	Ammonia, TOC	Diss. Manganese and Iron				Sulfide	Methane			UNPRES (1)	H_2SO_4 (1.8oz 2 vol)	HNO_3 (1)	HCl	NaOH	ZnAcNaOH (1)	Unpres. (3)		
01/15/13	1130		X	X			TW-1-011513	9	X	X	X				X	X			X	X			X	X			
01/15/13	1610		X	X			TW-2-011513	9	X	X	X				X	X			X	X			X	X			

THIS AREA FOR LAB USE ONLY

Lab #	Page	of
M1070		

EPA Tier QC Level: 1 (Screening) 2 3 4

Canister ID	Lab ID
	1
	2

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Volatile Contaminants/Odorous ☐ Biohazard ☐ Other

Relinquished By	BRAD OSTAPOWICZ	Date/Time 01/15/13 1900
Sampled By and Title	(Please sign and print name) BRAD OSTAPOWICZ - ASSOCIATE ENGINEER	Date/Time 1900 01/15/13
Received By	(Please sign and print name) Carmen Bell	Date/Time 1/16/13 @1100
Received By	(Please sign and print name)	Date/Time

Received By:		Date/Time
Relinquished By	(Please sign and print name)	Date/Time
Relinquished By	(Please sign and print name)	Date/Time
Shipped Via	UPS Fed-Ex Other COURIER	Tracking #

Special Instructions: DISS. Manganese and Iron - Field Filtered

Instructions and Agreement Provisions on Reverse Side

DISTRIBUTION: Original – LAB, Yellow – LAB, Pink – Client
Rev 10/2011 LAB FORM 340

CH2MHILL
Applied Sciences Laboratory (ASL)

Sample Receipt Record

Batch Number: M070
Client/Project: Kinder Morgan

Date received: 1-16-13
Checked by: CB
Checked by: _____

VERIFICATION OF SAMPLE CONDITIONS (verify all items), HD = Client Hand delivered Samples	NA	YES	NO
Radiological Screening for DoD	✓		
Were custody seals intact and on the outside of the cooler?		✓	
Type of packing material: (Ice) Blue Ice Bubble wrap		✓	
Was a Chain of Custody (CoC) Provided?		✓	
Was the CoC correctly filled out (If No, document in the SRER)		✓	
Did the CoC list a correct bottle count and the preservative types (Y=OK, N=Corrected on CoC)		N ✓	
Were the sample containers in good condition (broken or leaking)?		✓	
Containers supplied by ASL?		✓	
Any sample with < 1/2 holding time remaining? If so contact LPM		✓	✗ CB 1-16-13
Samples have multi-phase? If yes, document on SRER			✓
Was there ice in the cooler? Enter temp. If >6°C contact client/SRER 1.8 °C		✓	

All VOCs free of air bubbles? No, document on SRER	✓	✗ CB 1-16-13	
pH of all samples checked and met requirements? No, then document in SRER		✓	
Enough sample volume provided for analysis? No, document in SRER		✓	
Did sample labels agree with COC? No, document in SRER		✓	
Dissolved/Soluble metals filtered in the field?		✓	
Dissolved/Soluble metals have sediment in bottom of container? Document in SRER			✓

Sample ID	Reagent	Reagent Lot Number	Volume Added	Initials

ANALYSIS CHANGE ORDER

Requested By: Brad O /PDX Date Requested: 1/16/13

Approved By: Kathy M /CVO Date Approved: 1/16/13

Affected Batch/Samples: M1070

Client/Project: Kinder Morgan

Description of Problem: TV-2 (M1070-2) on HOLD except short HT ~~tests~~ (ferrous Fe, nitrate)

Corrective Action Taken: Attach to COC and delete HOLD analyses.

LIMS USE ONLY

Entered into LIMS (Name, date) Carmen Bell 1/16/13

Verified/Reviewed:

Comment:

DISTRIBUTION

O	LIMS	R. McMorris	(distribute to staff)
O	QA-Coordinator	G. Collins	(distribute to staff)
O	Data Packaging	D. Hardy	(distribute to staff)
O	Client Services	K. McKinley	(distribute to staff)
O	Inorganics	M. Bos	(distribute to staff)
O	Cations	M. Bos	(distribute to staff)
O	Organics	M. Schaadt	(distribute to staff)
O	Air Toxics	M. Schaadt	(distribute to staff)
O	Treatability	T. Maloney	(distribute to staff)
O	Bioassay	B. Muckey	(distribute to staff)

O INCLUDE IN FINAL REPORT

McKinley, Kathy/CVO

From: Ostapkowicz, Brad/PDX
Sent: Thursday, January 17, 2013 4:54 PM
To: McKinley, Kathy/CVO
Subject: Kinder Morgan - Linnton

Kathy,
I am following up on the samples for Kinder Morgan-Linnton. I have you holding sample TW-2. We should now whether we will analyze for all the analytes on Monday. If we have analytes that will go out of hold before then, we can analyze them.

Brad

ANALYTICAL REPORT

For:
Kinder Morgan

ASL Report #: M1075
Project ID: 467443.01.01
Attn: Keith Sheets/PDX
cc:
Eric Aronson/PDX

Authorized and Released By:

Laboratory Project Manager
Ben Thompson
(541) 758-0235 ext.23132
February 06, 2013

This data package meets standards requested by client and is not intended or implied to meet any other standard.

All analyses performed by CH2M HILL are clearly indicated. Any subcontracted analyses are included as appended reports as received from the subcontracted laboratory. The results included in this report only relate to the samples listed on the following Sample Cross-Reference page. This report shall not be reproduced except in full, without the written approval of the laboratory.

Any unusual difficulties encountered during the analysis of your samples are discussed in the attached case narratives.

Sample Receipt Comments

We certify that the test results meet all standard ASL requirements.

Sample Cross-Reference

ASL Sample ID	Client Sample ID	Date/Time Collected	Date Received
M107501	TW-6-011613	01/16/13 14:15	01/17/13

CASE NARRATIVE
HEADSPACE ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: M1075

Project: Kinder Morgan Project #: 467443.01.01

I. Method(s):

Analysis: RSK-175
Preparation: METHOD

II. Receipt/Holding Times:

All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):

All acceptance criteria were met.

B. Calibration Verification(s):

All acceptance criteria were met.

C. Blank(s):

All acceptance criteria were met.

D. Laboratory Control Sample(s):

All acceptance criteria were met.

E. Laboratory Duplicate Sample(s):

Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):

Analytical duplicate, selected from a second vial provided by the client, did not meet acceptance criteria of 20% RSD. For this batch, the LCS duplicate will serve as the analytical duplicate.

IV. Documentation Exception(s):

None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: _____ Date: 1/30/13

Reviewed by: Tiffany Hill Date: 2/4/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: **TW-6-011613**
Project Name: Kinder Morgan
Sample Date: 01/16/13
Sample Time: 14:15
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: **M107501**
Date Received: 01/17/13
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Volatiles									
Methane	74-82-8	1	0.018	0.32	506		ug/L	RSK-175	01/28/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: XB1-0128
Project Name: Kinder Morgan
Sample Date: N/A
Sample Time: N/A
Type: QC
Matrix: Water

Lab Information

Lab Sample ID: XB1-0128
Date Received: N/A
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Volatiles									
Methane	74-82-8	1	0.055	1.00	0.055	U	ug/L	RSK-175	01/28/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

LCS ID: BS1X0128
Report Revision No.: 0
Dilution Factor: 1

Analyte	CAS#	Spike Amount	Sample Result	Units	%Recovery	Analysis Method	Date Analyzed
GC Volatiles							
Methane	74-82-8	16.0	14.7	ug/L	92	RSK-175	01/28/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CASE NARRATIVE
METALS ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: M1075

Project: Kinder Morgan Project #: 467443.01.01

I. Method(s):

Analysis: E200.7
Preparation: FLDFLT

II. Receipt/Holding Times:

All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):

All acceptance criteria were met.

B. Calibration Verification(s):

All acceptance criteria were met.

C. Blanks:

All acceptance criteria were met.

D. Laboratory Control Sample(s):

All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):

Analyzed in accordance with standard operating procedure.

F. Interference Check Sample(s):

All acceptance criteria were met.

G. Serial Dilution(s):

Analyzed in accordance with standard operating procedure.

H. Digestion Exception(s):

None.

I. Analytical Exception(s):

None.

IV. Documentation Exception(s):

None.

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Prepared by: Emily Clark Date: 1/29/13

Reviewed by: [signature] Date: 4-30-13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: TW-6-011613
Project Name: Kinder Morgan
Sample Date: 01/16/13
Sample Time: 14:15
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: M107501F
Date Received: 01/17/13
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
Dissolved Metals									
Iron	7439-89-6	1	8.00	100	13200		ug/L	E200.7	01/25/13
Manganese	7439-96-5	1	0.73	10.0	3440		ug/L	E200.7	01/25/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: WB2-0122
Project Name: Kinder Morgan
Sample Date: N/A
Sample Time: N/A
Type: QC
Matrix: Water

Lab Information

Lab Sample ID: WB2-0122
Date Received: N/A
Report Revision No.: 0

Analyte	CAS#	Dilution Factor	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
Metals									
Iron	7439-89-6	1	8.00	100	8.00	U	ug/L	E200.7	01/25/13
Manganese	7439-96-5	1	0.73	10.0	0.73	U	ug/L	E200.7	01/25/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

LCS ID: BS2W0122
Report Revision No.: 0
Dilution Factor: 1

Analyte	CAS#	Spike Amount	Sample Result	Units	%Recovery	Analysis Method	Date Analyzed
Metals							
Iron	7439-89-6	500	522	ug/L	104	E200.7	01/25/13
Manganese	7439-96-5	500	489	ug/L	98	E200.7	01/25/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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EC130128-17.18-M1075-M

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CASE NARRATIVE
GENERAL CHEMISTRY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: M1075

Project: Kinder Morgan Project #: 467443.01.01

I. Method(s):

Analysis: E300.0A

II. Receipt/Holding Times:

All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):

All acceptance criteria were met.

B. Calibration Verification(s):

All acceptance criteria were met.

C. Blanks:

All acceptance criteria were met.

D. Laboratory Control Sample(s):

All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):

Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):

None.

IV. Documentation Exception(s):

None.

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Prepared by: _____ Date: 2/4/2013

Reviewed by: _____ Date: 2/6/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 01/17/13

Type: See C.O.C.

Matrix: Water

Lab Information

Lab Batch ID: M1075

Analysis Method: E300.0A

Units: mg/L

Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	RL	Nitrate-N Result	Qualifier	Date Analyzed
General Chemistry							
TW-6-011613	M107501	1	0.0077	0.10	0.081	J	01/17/13 20:07
WB1-0117	WB1-0117	1	0.0077	0.10	0.0077	U	01/17/13 16:11

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: M1075

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W0117	Nitrate-N	3.00	2.79	mg/L	93	E300.0A	01/17/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CASE NARRATIVE
AUTOMATED CHEMISTRY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: M1075

Project: Kinder Morgan Project #: 467443.01.01

I. Method(s):
Analysis: E350.1

II. Receipt/Holding Times:
All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blanks:
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):
Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):
None.

IV. Documentation Exception(s):
None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: _____ Date: 1/25/2013

Reviewed by: _____ Date: 01/28/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan

Date Received: 01/17/13

Type: See C.O.C.

Matrix: Water

Lab Information

Lab Batch ID: M1075

Analysis Method: E350.1

Units: mg/L

Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	Ammonia-N RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-6-011613	M107501	1	0.014	0.10	0.25		01/23/13
WB1-0123	WB1-0123	1	0.014	0.10	0.014	U	01/23/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: M1075

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W0123	Ammonia-N	1.16	1.17	mg/L	101	E350.1	01/23/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CASE NARRATIVE
WET CHEMISTRY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: M1075

Project: Kinder Morgan Project #: 467443.01.01

I. Method(s):
Analysis: SM5310B

II. Receipt/Holding Times:
All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):
All acceptance criteria were met.

B. Calibration Verification(s):
All acceptance criteria were met.

C. Blanks:
All acceptance criteria were met.

D. Laboratory Control Sample(s):
All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):
Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):
None.

IV. Documentation Exception(s):
None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: _____ Date: 1/22/2013

Reviewed by: Kathleen McCann Date: 1/23/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Date Received: 01/17/13
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: M1075
Analysis Method: SM5310B
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	RL	Total Organic Carbon Result	Qualifier	Date Analyzed
General Chemistry							
TW-6-011613	M107501	1	0.047	0.50	3.37		01/18/13
WB1-0118	WB1-0118	1	0.047	0.50	0.11	J	01/18/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: M1075

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W0118	Total Organic Carbon	5.00	4 81	mg/L	96	SM5310B	01/18/13

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CASE NARRATIVE
WET CHEMISTRY ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: M1075

Project: Kinder Morgan Project #: 467443.01.01

I. Method(s):

Analysis: SM2510B, SM3500-FE B, SM4500-S D, SM5310B, SM2320B

II. Receipt/Holding Times:

All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):

All acceptance criteria were met.

B. Calibration Verification(s):

All acceptance criteria were met.

C. Blanks:

All acceptance criteria were met.

D. Laboratory Control Sample(s):

All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):

Analyzed in accordance with standard operating procedure.

F. Analytical Exception(s):

None.

IV. Documentation Exception(s):

None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signatures.

Prepared by: Janet McGeary Date: 1/31/13

Reviewed by: Kathey McKinley Date: 1/31/13

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Date Received: 01/17/2013
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: M1075
Analysis Method: SM2320B
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	Alkalinity, Total as CaCO3 RL	Result	Qualifier	Date Analyzed
General Chemistry							
TW-6-011613	M107501	1	N/A	5.0	311		01/18/2013
WB1-0118	WB1-0118	1	N/A	5.0	5 0		01/18/2013

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Date Received: 01/17/2013
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: M1075
Analysis Method: SM2510B
Units: umhos/cm
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	RL	Conductivity Result	Qualifier	Date Analyzed
General Chemistry							
TW-6-011613	M107501	1	N/A	10.0	611		01/18/2013
WB1-0118	WB1-0118	1	N/A	10.0	10.0	U	01/18/2013

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Date Received: 01/17/2013
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: M1075
Analysis Method: SM3500-FE B
Units: mg/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	RL	Ferrous Iron Result	Qualifier	Date Analyzed
General Chemistry							
TW-6-011613	M107501	10	0.39	1.00	5.48		01/17/2013 17:06
WB1-0117	WB1-0117	1	0.039	0.10	0.039	U	01/17/2013 16:47

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Date Received: 01/17/2013
Type: See C.O.C.
Matrix: Water

Lab Information

Lab Batch ID: M1075
Analysis Method: SM4500-S D
Units: ug/L
Report Revision No.: 0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	RL	Sulfide Result	Qualifier	Date Analyzed
General Chemistry							
TW-6-011613	M107501	1	7.96	25.0	27.6		01/21/2013
WB1-0121	WB1-0121	1	7.96	25.0	7.96	U	01/21/2013

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: Kinder Morgan
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: M1075

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W0117	Ferrous Iron	1.00	1.13	mg/L	113	SM3500-FE B	01/17/2013
BS1W0118	Alkalinity, Total as CaCO3	48.0	48.6	mg/L	101	SM2320B	01/18/2013
BS1W0118	Conductivity	384	375	umhos/cm	98	SM2510B	01/18/2013
BS1W0121	Sulfide	331	350	ug/L	106	SM4500-S D	01/21/2013

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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JM130129-09'23-M1075-W

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CH2MHill Applied Sciences Lab
CHAIN OF CUSTODY RECORD
AND AGREEMENT TO PERFORM SERVICES

~~CVO 2300 NW Walnut Boulevard~~
~~Corvallis, OR 97330-3598~~
~~(541) 752-4271 FAX (541) 752-0276~~

1100 NE CIRCLE BLVD, SUITE 300
CORVALLIS OR 97330
541 - 753 - 3126 FAX 541-752-0276

COC #

Project #	Purchase Order #
467443.01.01	
Project Name	KINDER MORGAN - LINTON
Company Name	CH2M HILL/PDX
Report to:	kieth.sheets@ch2m.com
Phone No:	503-235-5000
Requested Completion Date:	STANDARD
Sample Disposal:	Dispose ☒ Return ☐

Sampling Date	Sampling Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	Matrix AIR	Matrix Other	CLIENT SAMPLE ID (8 CHARACTERS)	LAB QC	TOTAL # OF CONTAINERS	N. Trate, Alkalinity, Conductivity, Ferrous Iron	Ammonia, TDC	Diss. Manganese and Iron	Sulfide	Methane					Alternate Description	Lab ID
											Unpres	H_2SO_4	HNO_3	$ZnAcNaOH$	Unpres.						
10/16/13	1415		X	X				TW-6-101613		9	X	X	X	X	X						1

Requested Analytical Method #

(1) 1 HCl 2 4°C — 1 unpres — 1 H_2SO_4 — Preservative

THIS AREA FOR LAB USE ONLY
Lab # M1075 Page of
4.1

EPA Tier QC Level
1 (Screening) 2 3 4

Relinquished By	Date/Time	Received By	Date/Time
Brad Ostrowski	10/16/13 2000		
Sampled By and Title (Please sign and print name)	**Date/Time**	**Relinquished By** (Please sign and print name)	**Date/Time**
Brad Ostrowski Associate Engineer	10/16/13 2000		
Received By (Please sign and print name)	**Date/Time**	**Relinquished By** (Please sign and print name)	**Date/Time**
Carmen Bell	10/17/13 @		
Received By (Please sign and print name)	**Date/Time**	**Shipped Via** UPS Fed-Ex Other Courier	**Shipping #**

Special Instructions: Diss. Manganese and Iron - Field Filtered

Instructions and Agreement Provisions on Reverse Side

DISTRIBUTION: Original - LAB, Yellow - LAB, Pink - Client
Rev 2/01 Lab form 340

CH2MHILL
Applied Sciences Laboratory (ASL)

Sample Receipt Record

Batch Number: 111075
Client/Project: Kinder Morgan

Date received: 1-17-13
Checked by: OK
Checked by: _____

VERIFICATION OF SAMPLE CONDITIONS (verify all items). HD = Client Hand delivered Samples	NA	YES	NO
Radiological Screening for DoD		✓	
Were custody seals intact and on the outside of the cooler?		✓	
Type of packing material: Ice Blue Ice Bubble wrap		✓	
Was a Chain of Custody (CoC) Provided?		✓	
Was the CoC correctly filled out (If No, document in the SRER)		✓	
Did the CoC list a correct bottle count and the preservative types (Y=OK, N=Corrected on CoC)		✓	
Were the sample containers in good condition (broken or leaking)?		✓	
Containers supplied by ASL?		✓	
Any sample with < 1/2 holding time remaining? If so contact LPM			✓
Samples have multi-phase? If yes, document on SRER			✓
Was there ice in the cooler? Enter temp. If >6°C contact client/SRER 4.1 °C		✓	

All VOCs free of air bubbles? No, document on SRER	✓		
pH of all samples checked and met requirements? No, then document in SRER		✓	
Enough sample volume provided for analysis? No, document in SRER		✓	
Did sample labels agree with COC? No, document in SRER		✓	
Dissolved/Soluble metals filtered in the field?		✓	
Dissolved/Soluble metals have sediment in bottom of container? Document in SRER			✓

Sample ID	Reagent	Reagent Lot Number	Volume Added	Initials

Attachment 2
Data Quality Evaluation Report

Kinder Morgan – Linnton
December 2012 – January 2013 Water Sampling
Data Quality Evaluation Report

Introduction

The objective of this data quality evaluation (DQE) report is to assess the data quality of analytical results for water samples collected at the Kinder Morgan Linnton Site. Individual method requirements and guidelines from the United States Environmental Protection Agency (USEPA) Contract Laboratory National Functional Guidelines (NFG) for Inorganic Data Review, July 2002 and USEPA Contract Laboratory NFG for Organic Data Review, June 2008 were used in this assessment.

This report is intended as a general data quality assessment designed to summarize data issues.

Analytical Data

This DQE report covers seven normal water samples. A list of samples and collection dates is included in Attachment A at the end of this DQE report. Samples were collected December 18, 2012 through January 16, 2013. These sample results were reported as four sample delivery groups (SDG) listed in Table 1. The analyses were performed by ALS Environmental in Kelso, Washington (ALS) and Applied Sciences Laboratory in Corvallis, Oregon (ASL).

Table 1 - Sample Delivery Group
K1212737
K1300509
M1075
M1070

Ten methods were used to analyze the environmental samples. Selected samples were analyzed for one or more of the following analytes/methods presented in Table 2.

Table 2 - Analytical Parameters by Laboratory		
Parameter	**Method**	**Laboratory**
Arsenic Speciation	E1632	ALS
Dissolved Iron and Manganese	E200.7	ASL
Nitrate as N	E300.0	ASL
Ammonia	E350.1	ASL
Methane	RSK-175	ASL
Alkalinity	SM2320B	ASL

Table 2 - Analytical Parameters by Laboratory		
Parameter	**Method**	**Laboratory**
Conductivity	SM2510B	ASL
Ferrous Iron	SM3500-FE B	ASL
Sulfide	SM4500-S D	ASL
Total Organic Carbon	SM5310B	ASL

The data validation included a review of the following items: (1) the chain-of-custody (CoC) documentation; (2) holding-time compliance; (3) the required field and laboratory quality control (QC) samples; (4) flagging for method blanks; (5) laboratory control sample/laboratory control sample duplicates (LCS/LCSD); and, (6) matrix spike/matrix spike duplicate samples (MS/MSD).

Data flags are assigned according to the NFG. Multiple flags are routinely applied to specific sample method/matrix/analyte combinations, but there will be only one final flag. A final flag is applied to the data and is the most conservative of the applied validation flags. The final flag also includes blank sample impacts.

The data flags are those listed in the NFG and are defined below:

- J = Analyte was present but the reported value may not be accurate or precise (estimated). The result was estimated due to either being less than the referenced reporting limit but greater than the method detection limit or due to a QC exceedance.
- R = The result was unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.
- U = Analyte was not detected at the specified detection limit.
- UJ = Analyte was not detected and the specified detection limit may not be accurate or precise (estimated).

Findings

The overall summaries of the data validation findings are contained in the following sections and Table 3.

Holding Times

All holding-time criteria were met with one exception.

Sample TW-2-011513 was analyzed outside of holding time for Method SM2510B. The associated detected result was qualified as estimated and flagged "J".

Samples Surface Water-121912, TW-3-121912 and TW-4-121912 were analyzed outside of holding time for Method RSK-175. The associated detected results were qualified as estimated and flagged "J".

Calibration

Calibration information was not supplied in the Level II validation reports and could not be directly verified to have met control criteria. However, the laboratory case narratives and/or footnotes in the laboratory data packages were reviewed by the data validator and no exceptions were noted.

Method Blanks

Method blanks were analyzed at the required frequency and were free of contamination except as noted below.

Dissolved arsenic III was detected in a method blank below the reporting limit for Method E1632. Associated detected sample results less than five times the blank concentration were qualified as not detected and flagged "U".

Total alkalinity was detected in a method blank above the reporting limit for Method SM2320B. Associated detected sample results less than five times the blank concentration were qualified as not detected and flagged "U".

Field Blanks

Field blanks were not collected.

Matrix Spike Samples

The results of MS/MSD analyses provide information about the possible influence of the matrix on either accuracy or precision of the measurements. All acceptance criteria were met.

Field Duplicates

Field duplicates were not collected.

Laboratory Duplicates

The laboratory duplicate relative percent difference (RPD) of methane was greater than the upper control limit in sample TW-6-011613 for Method RSK175. The associated detected result was qualified as estimated and flagged "J".

Laboratory Control Samples

LCS/LCSDs were analyzed for all methods as required. No exceedances were observed that would affect the sample results.

Chain of Custody

Each sample was documented in a completed chain-of-custody and received at the laboratory within temperature criteria.

Overall Assessment

The final activity in the data quality evaluation is an assessment of whether the data meets the data quality objectives (DQO). The goal of this assessment is to demonstrate that a sufficient number of representative samples were collected and the resulting analytical data can be used

to support the decision-making process. The following summary highlights the data evaluation findings for the above defined events:

1. No data were rejected and completeness is 100 percent.
2. Approximately 50 percent of the E1632 data, and 14 percent of the SM2320B data, were qualified due to low-level method blank contamination. The degree to which blank contamination was observed is within reasonable method expectations considering the small size of the dataset.
3. A laboratory duplicate RPD exceedance was observed for Method RSK175.
4. One sample was analyzed outside of holding time for Method SM2510B and three samples were analyzed outside of holding time for Method RSK-175.
5. Overall the precision and accuracy of the data, as measured by laboratory and field QC indicators, suggest that the DQOs were met.

Table 3 – Validation Flags

Field ID	Method	Analyte	Final Result	Units	Final Flag	Reason
Surface Water-121912	1632AF	ARSENIC III, dissolved	0.039	ug/L	U	LB<RL
Surface Water-121912	RSK-175	Methane	2.92	UG/L	J	HTa>UCL
Surface Water-121912	SM2320B	Alkalinity, Total	23.9	MG/L	U	LB>RL
TW-2-011513	SM2510B	Conductivity	928	umhos/cm	J	HTa>UCL
TW-3-121912	1632AF	ARSENIC III, dissolved	0.012	ug/L	U	LB<RL
TW-3-121912	RSK-175	Methane	0.13	UG/L	J	HTa>UCL
TW-4-121912	1632AF	ARSENIC III, dissolved	0.016	ug/L	U	LB<RL
TW-4-121912	RSK-175	Methane	16.4	UG/L	J	HTa>UCL
TW-5-121812	1632AF	ARSENIC III, dissolved	0.012	ug/L	U	LB<RL
TW-6-011613	RSK-175	Methane	506	ug/L	J	LabDupRPD

Note:
HTa>UCL = Analytical holding time exceeded
LabDupe>RPD = Laboratory duplicate exceeded relative percent difference criteria
LB<RL= Analyte detected in the method blank below the reporting limit
LB>RL= Analyte detected in the method blank above the reporting limit

Attachment A

Samples Associated with DQE			
SampleID	**Matrix**	**Sample Type**	**Sample Date**
Surface Water-121912	Water	N	12/19/2012
TW-1-011513	Water	N	1/15/2013
TW-2-011513	Water	N	1/15/2013
TW-3-121912	Water	N	12/19/2012
TW-4-121912	Water	N	12/19/2012
TW-5-121812	Water	N	12/18/2012
TW-6-011613	Water	N	1/16/2013

Notes:
N = normal sample